

LET US UNDERSTAND MATHEMATICS

CLASS 3

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PREFACE

This is part of a series of books based on NCERT syllabus and research on teaching of mathematics for class 3. The focus here is on laying a foundation for further learning of mathematics and understanding of concepts and procedures. Accordingly concepts are presented by manipulatives, pictures, real world situations, spoken and written words and symbols and opportunities are provided for translation from one mode to another.

Automaticity (answering without thinking) of addition, multiplication, subtraction and division facts are emphasized. The teachers should provide more practice if necessary for mastery of fundamental concepts and adequate understanding of procedures use objects that are readily available or situations for exercises that are familiar to the children in the class. Ample opportunities are provided for applications of mathematics to real world situations, reasoning, communication and problem solving.

The schools that can should provide ample quantities of materials such as counters, tiles, geometrical models, tangram pieces, blocks, geoboards, dot papers, balances, fraction pieces, graphs, scissor, ropes. The schools that do not have labs, the children in class 3 should buy or provided with 3 sets of 10 sticks of different thickness to represent 1-sticks, ten-sticks and 100-sticks. The children should also be provided with models of cube, cuboid, cylinder and cone, a set of tangram pieces, a balance and some marbles.

The exercises with manipulatives and oral work are included to facilitate the teacher's work. Activity sheets are provided for many activities that can be photocopied for students and used.

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UNIT 1

Numbers from 100-999

Recall we grouped objects by 10 for counting objects from 10-99. Ninety-nine objects, say sticks were grouped into 9 bundles of ten sticks and 9 sticks were left over. If we add one more stick to it the collection will have 10 single sticks, which can be grouped into one more bundle of ten sticks giving us 10 bundles of ten sticks. As our number system is based on ten, as soon as we have ten of a group, we group these into a bigger group with a new name. We group 10 bundles of ten-sticks and call it a bundle of **hundred** sticks. Thus if we have more than 10 bundles of 10 sticks, we group those as bundles of hundred-sticks and ten-sticks.

Or we can write 99 in expanded form

$$99 = 9 \text{ tens} + 9 \text{ ones}$$

The next number would be 1 more; we now have ten ones which is equal to one ten, this and 9 tens make ten tens. As our number system is based on ten, as soon as we have ten of a group, we give it a new name. Ten tens are named as one **hundred**. We need a place for writing it; we use a place to the left of tens called **hundred's place** to write it. As the number one more than 99 has 1 hundred, 0 tens and 0 one, we write it as 100. The next number would be one more and would have 1 hundred, 0 tens and 1 one and we would write it as 101 and read as one hundred one. We can write numbers till 109 by increasing by 1 the number in unit's place and reading it as one hundred followed by the number in unit's place. The next number would have 10 ones which is same as 1 ten, therefore we write it as 110 with 1 in hundred's and ten's place and 0 in one's place, and read it as one hundred and ten. The numbers from 100-199 may be written in order as in the table given below. The numbers beyond 110 up to 199 are read as one hundred followed by the two digit number. For example, 172, 123, 189 are read as one hundred seventy two, one hundred twenty three and one hundred eighty nine respectively.

100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199

Read the numbers from 100-199 by reading this table. Start reading numbers in first row from left to right beginning from 100, then the numbers in the next row from left to right and so on.

How are the numbers changing from one box to the next in the same row?

How are the numbers changing from one box to the next in the same column?

What digit is in hundred's place in all these numbers?

Numbers from 200- 299

199 sticks = 1 bundle of 100 sticks + 9 bundles of ten sticks + 9 sticks or If we have one more sticks, we can then make another bundle of ten sticks that will give us ten bundles of ten-sticks and 0 single sticks. These ten bundles of ten-sticks can be made into a bundle of 100 sticks giving us 2 bundles of 100 sticks.

Or we can write the number in expanded form

$$199 = 1 \text{ hundred} + 9 \text{ tens} + 9 \text{ ones}$$

The next number would be 1 more than 199. We now have ten ones which we rename as one ten, this and 9 tens make ten tens which we rename as one hundred that together with one hundred makes two hundred we write it as 200. The numbers from 200 - 299 can be written in a manner similar to numbers from 100 - 199 by writing 2 in hundred's place instead of one. These are read as two hundred followed by the number. A table giving numbers from 200 - 299 is given below:

200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
230	231	232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249
250	251	252	253	254	255	256	257	258	259
260	261	262	263	264	265	266	267	268	269
270	271	272	273	274	275	276	277	278	279
280	281	282	283	284	285	286	287	288	289
290	291	292	293	294	295	229	297	298	299

Read the numbers 200-299 by reading numbers in first row from left to right beginning from 200, then the numbers in the next row from left to right and so on.

How are the numbers changing from one box to the next in the same row?

How are the numbers changing from one box to the next in the same column?

What digit is in hundred's place in all these numbers?

Numbers from 300- 399

$299 = 2$ bundles of 100 sticks + 9 bundles of ten sticks + 9 sticks

If we have one more sticks, we can then make another bundle of ten sticks that will give us ten bundles of ten-sticks and 0 single sticks. These ten bundles of ten-sticks can be made into a bundle of 100 sticks giving us 3 bundles of 100 sticks.

Or, we can write the number in expanded form

$299 = 2$ hundreds + 9 tens + 9 ones if we write the number in expanded form.

The next number would be 1 more than 299. We now have ten ones which we rename as one ten, this and 9 tens make ten tens which we rename as one hundred that together with two hundreds makes three hundreds we write it as 300. The numbers from 300-399 can be written in a manner similar to numbers from 100-199 by writing 3 in hundred's place instead of one.

These are read as three hundred followed by the two-digit number. A table giving numbers from 300-399 is given below:

300	301	302	303	304	305	306	307	308	309
310	311	312	313	314	315	316	317	318	319
320	321	322	323	324	325	326	327	328	329
330	331	332	333	334	335	336	337	338	339
340	341	342	343	344	345	346	347	348	349
350	351	352	353	354	355	356	357	358	359
360	361	362	363	364	365	366	367	368	369
370	371	372	373	374	375	376	377	378	379
380	381	382	383	384	385	386	387	388	389
390	391	392	393	394	395	396	397	398	399

Read the numbers from 300-399 by reading this table in a manner similar to 200 -299 table.

How are the numbers changing from one box to the next in the same row?

How are the numbers changing from one box to the next in the same column?

What digit is in hundred's place in all these numbers?

Numbers from 400- 499

$399 = 3$ bundles of 100 sticks + 9 bundles of ten sticks + 9 sticks

If we have one more sticks, we can then make another bundle of ten sticks that will give us ten bundles of ten-sticks and 0 single sticks. These ten bundles of ten-sticks can be made into a bundle of 100 sticks giving us 4 bundles of 100 sticks.

Or, we can write the number in expanded form

$399 = 3$ hundreds + 9 tens + 9 ones

The next number would be 1 more than 399. We now have ten ones which we rename as one ten, this and 9 tens make ten tens which we rename as one hundred that together with three hundreds makes four hundreds we write it as 400. The numbers from 400-499 can be written in a manner similar to numbers from 100-199 by writing 4 in hundred's place instead of one.

These are read as four hundred followed by the number.

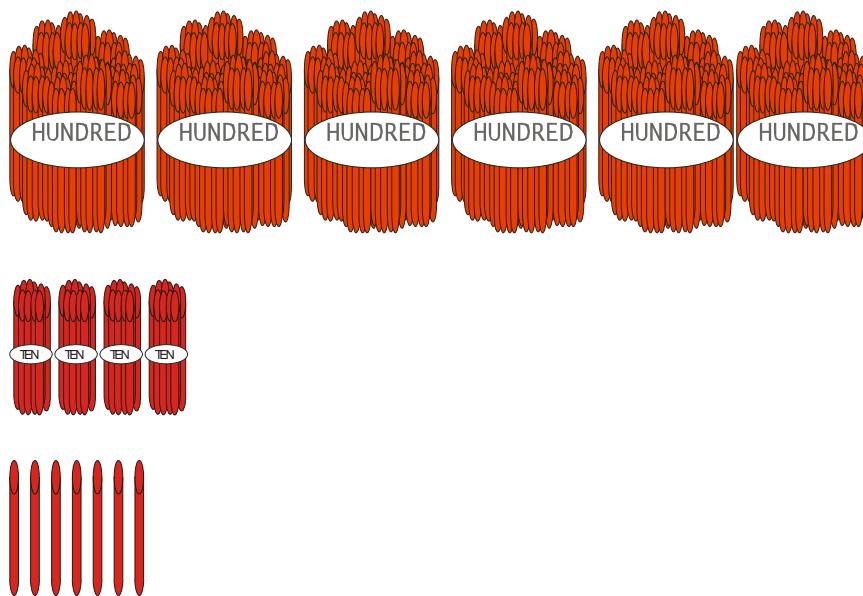
We can similarly write numbers from 500-599, 600-699, 700-799, 800-899 and 900-999.

One more than 999 would give us 10 ones, which we rename as one ten that along with 9 tens gives 10 tens which we rename as one hundred; we now have 10 hundreds and need a new name for it. Ten hundreds are renamed as **one thousand**. We need a place called thousand's place to write it. It is

written to the left of hundred's place. As we have one thousand and 0 hundreds, 0 tens and 0 ones, it is written as 1000.

Place values in three digit numbers

We can find the number of objects given groups of hundreds, tens and ones by first counting the hundreds, and then counting on the tens and then counting on the ones. For example, given the following, bundles of hundred sticks, bundles of ten sticks and single sticks:



We can find the total number of sticks in these by first counting the bundles of hundred sticks 100, 200, 300, 400, 500, 600, then counting on by ten four times 610, 620, 630, 640 and then counting on seven numbers 641, 642, 643, 644, 645, 646, 647. Thus, the number of sticks is 647.

Similarly if we have 4 hundred rupee notes, 5 ten rupee notes and 6 one rupee notes (teacher can show paper money here or if all students can have it ask them to set aside these). We can find the total amount of money by first counting the hundred rupee notes 100, 200, 300, 400 then counting on by ten five times-410, 420, 430, 440, 450 and then counting on six times-451, 452, 453, 454, 455 and 456. Thus, the total amount of money is 456 rupees.

Expanded form of numbers

In a three digit number the first digit on the right is in ones place, the digit on its left is in tens place and the digit to the left of tens place is in hundreds place. Place values of these are as many ones, tens or hundreds as the digit in that place. For example, in 458, 8 is in one's place and its place value is 8, 5 is in ten's place and its place value is 5 tens or 50 and 4 is in hundred's place and its place value is 4 hundreds or 400.

Therefore, we can express three-digit number as follows:

$$743 = 7 \text{ hundreds} + 4 \text{ tens} + 3 \text{ ones} = 700 + 40 + 3 = 743.$$

$$872 = 8 \text{ hundreds} + 7 \text{ tens} + 2 \text{ ones} = 800 + 70 + 2 = 872.$$

$$260 = 2 \text{ hundreds} + 6 \text{ tens} + 0 \text{ ones} = 200 + 60 + 0 = 260.$$

Writing a numbers in terms of place values is called **expanded form of numbers**.

Exercise 1.1

Write the missing numbers in the table from 400-499 given below:

400	401		403	404	405	406		408	409
410	411	412	413		415	416	417	418	419
420	421	422	423	424	425		427	428	429
430		432	433	434	435	436	437		439
440	441	442		444	445	446	447	448	
450	451	552	453		455	456		458	459
	461		463	464	465	466	467	468	469
470	471	472	473	474		476	477	478	
480		482	483	484	485		487		489
490	491	492		494	495	496		498	499

Write numbers from 700-799 in the table given below:

Count by 10 from 100 to 190 from 100 - 199 table.

Count by 10 six numbers beginning from 230 from 200-299 table.

Exercise 1.2

1. Count the numbers from 650-699.
2. Read the following numbers:
216, 356, 660, 874, 183, 355, 549, 771, 86, 706, 199, 800, 336, 868, 992, 525, 112, 258, 432, 909.
3. Write the following numbers (to be dictated by the teacher):
464, 708, 347, 215, 838, 179, 236, 559, 641, 982, 393, 164, 444, 938, 502, 276, 785, 597, 430, and 700.
4. Write the following numbers in figures:

Three hundred eighty-one _____

Six hundred thirteen _____

Four hundred seventy-three _____

Two hundred fifty-six _____

Nine hundred twenty-four _____

One hundred forty _____

Eight hundred sixty-seven _____

Seven hundred ninety-two _____

Five hundred _____

Three hundred eighty _____

Nine hundred ninety-nine _____

Two hundred Forty-eight _____

One hundred seventeen _____

5. Write the following numbers in words:

546	→	Five hundred forty-six
330	→	
681	→	
877	→	
912	→	
175	→	
504	→	
200	→	
48	→	
96	→	
900	→	
817	→	
425	→	
339	→	
266	→	
114	→	
845	→	

Exercise 1.3

Write numbers that come just after the following numbers

247	248
382	
704	
420	
649	
399	
742	
509	
689	
400	
565	
843	
799	

Write numbers that come just before the following numbers

456	457
	873
	608
	234
	450
	100
	756
	920
	900
	732
	819
	640
	500

Write numbers that come between the following numbers

10	11	12
457		459
320		322
456		458
269		271
624		626
299		301
488		490
304		306
119		121
525		527
768		770
899		901

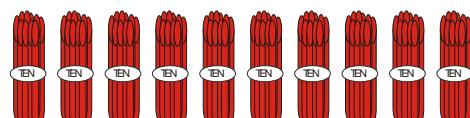
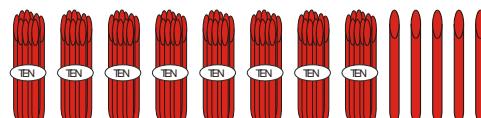
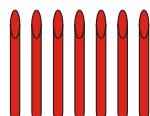
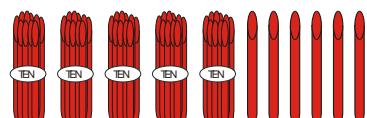
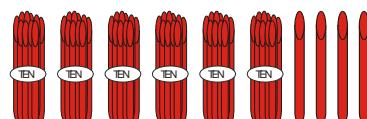
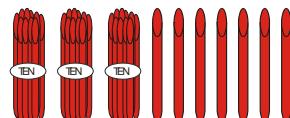
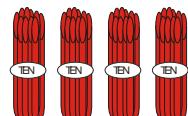
Exercise 1.4

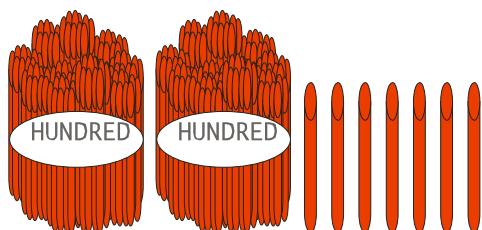
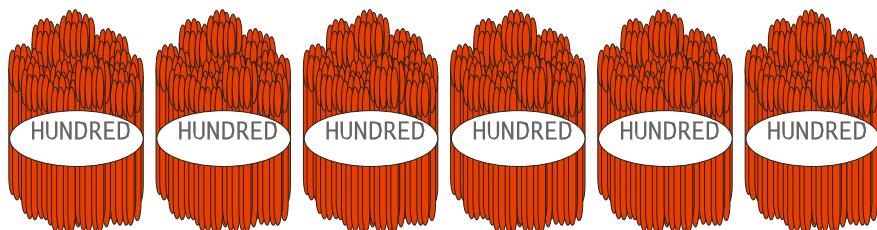
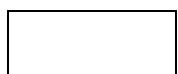
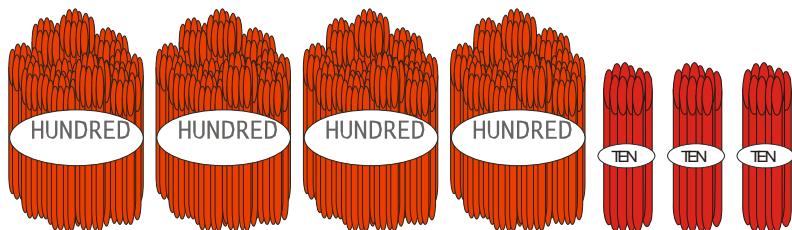
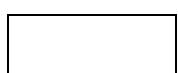
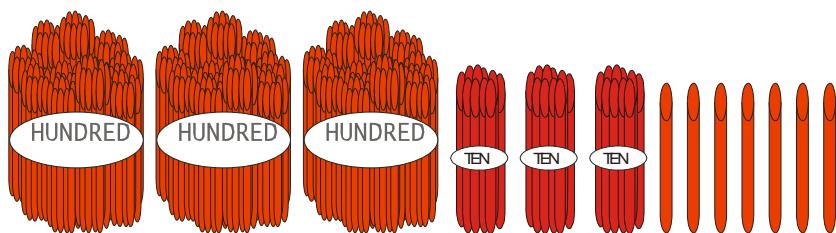
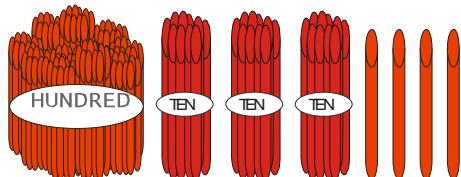
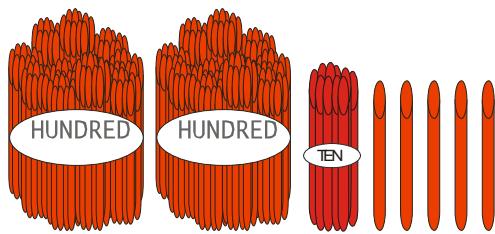
Write the next two numbers of the series given below:

1. 100, 200, 300, , .
2. 283, 285, 287, , .
3. 610, 620, 630, , .
4. 960, 950, 940, , .
5. 412, 422, 432,
6. 800, 700, 600, , .
7. 502, 501, 500, , .
8. 781, 779, 777, , .
9. 385, 375, 365, , .
10. 216, 316, 416, , .

Exercise 1.5

1. Show the following numbers of sticks using single sticks and bundles of ten sticks and bundles of hundred sticks:
245, 111, 346, 563, 687, 190, 972, 284, 339, 453, 700, 487, 560.
2. A number of groups of bundles of hundred sticks, ten sticks and single sticks are given below, write the total number of sticks against them:





Exercise 1.6

1. How many one rupee notes can you get for one ten rupee notes?
2. How many ten rupee notes can you get for one hundred rupee notes?
3. If a person has the following number of hundred rupees notes, ten rupees notes and one rupee notes in his wallet, how much money does he have?

3 hundred rupee notes, 4 ten rupee notes and 5 one rupee notes = Rs.345

5 hundred rupee notes, 2 ten rupee notes and 6 one rupee notes =

2 hundred rupee notes, 6 ten rupee notes and 3 one rupee notes =

4 hundred rupee notes, 8 ten rupee notes and 7 one rupee notes =

6 hundred rupee notes =

8 hundred rupee notes, 5 ten rupee notes =

1 hundred rupee notes, 7 ten rupee notes and 6 one rupee notes =

3 hundred rupee notes, 4 ten rupee notes and 9 one rupee notes =

5 hundred rupee notes, 3 ten rupee notes and 2 one rupee notes =

7 hundred rupee notes, 8 ten rupee notes and 4 one rupee notes =

4 hundred rupee notes =

2 hundred rupee notes and 6 ten rupee notes =

8 hundred rupee notes, 9 ten rupee notes and 7 one rupee notes =

9 hundred rupee notes, 1 ten rupee note and 5 one rupee notes =

Exercise 1.7

1. Write the numeral for the numbers for which the expanded forms are given below:

5 hundreds + 6 tens + 4 ones

564

6 hundreds + 4 tens + 7 ones

3 hundreds + 8 tens + 2 ones

4 hundreds + 5 tens

8 hundreds + 9 tens + 6 ones

1 ten + 3 ones

8 hundreds

2. Write the following numbers in expanded form:

$$432 = 4 \text{ hundreds} + 3 \text{ tens} + 2 \text{ ones} = 400 + 30 + 2$$

$$627 = \underline{\quad} \text{hundreds} + \underline{\quad} \text{tens} + \underline{\quad} \text{ones} =$$

$$840 = \underline{\quad} \text{hundreds} + \underline{\quad} \text{tens} + \underline{\quad} \text{ones} =$$

$$217 = \underline{\quad} \text{hundreds} + \underline{\quad} \text{tens} + \underline{\quad} \text{ones} =$$

$$308 = \underline{\quad} \text{hundreds} + \underline{\quad} \text{tens} + \underline{\quad} \text{ones} =$$

$$295 = \underline{\quad} \text{hundreds} + \underline{\quad} \text{tens} + \underline{\quad} \text{ones} =$$

$$124 = \underline{\quad} \text{hundreds} + \underline{\quad} \text{tens} + \underline{\quad} \text{ones} =$$

$$939 = \underline{\quad} \text{hundreds} + \underline{\quad} \text{tens} + \underline{\quad} \text{ones} =$$

3. Write the place of the underlined digit (tens or ones) in the box:

$$\underline{2}45 \quad \boxed{5 \text{ ones}} \quad = 5$$

$$\underline{3}47 \quad \boxed{} \quad =$$

$$\underline{1}64 \quad \boxed{} \quad =$$

$$\underline{3}87 \quad \boxed{} \quad =$$

$$79\underline{1} \quad \boxed{} \quad =$$

$$\underline{8}66 \quad \boxed{} \quad =$$

$$\underline{1}05 \quad \boxed{} \quad =$$

4. Find the place value of the following digits in the given numbers and write it in the box against them:

$$5 \text{ in } 256 \quad \boxed{5 \text{ tens} = 50}$$

$$7 \text{ in } 647 \quad \boxed{}$$

$$1 \text{ in } 108 \quad \boxed{}$$

$$3 \text{ in } 30 \quad \boxed{}$$

$$6 \text{ in } 456 \quad \boxed{}$$

$$9 \text{ in } 497 \quad \boxed{}$$

$$8 \text{ in } 368 \quad \boxed{}$$

$$0 \text{ in } 406 \quad \boxed{}$$

Comparison of numbers from 0-999

You may recall that the digits in different places have different values. The first digit on the right is in one's place has the value 1 and its value is the same as the digit. The digit on its left is in ten's place has the value 10 and we count as many tens as the digit to find its value. The digit on left of ten's place is in hundred's place has the value 100 and we count as many hundreds as the digit to find its value. The number is equal to the sum of all these values. We can compare numbers by either remembering the number that came earlier in counting is less than the number that came later in counting. Alternatively, we can compare numbers by looking at the digits.

1. If the number of digits is different in the two numbers, the number with larger number of digits is greater than the one that has fewer digits, for example, $234 > 87, 45 > 9$.
2. If the two numbers have the same number of digits, we first look at the digit in hundreds place in the two numbers. If these are different then the number in which hundreds digit is larger is greater than the number in which digit in hundreds place is smaller. For example, $456 > 278$ or $278 < 456, 835 > 635$ or $635 < 835$.
3. If the digit in hundreds place is the same in both the numbers, then we compare the digits in tens place. If these are different the number in which tens digit is larger is greater than the number in which digit in tens place is smaller. For example, $247 > 228$ or $228 < 247, 478 > 459$ or $459 < 478$.
4. If the digit in hundred's place as well as ten's place is the same in both the numbers. Then we compare the digits in one's place. If these are different, the number in which digit in one's place is larger is greater than the number in which digit in one's place is smaller. For example, $783 > 782$ or $782 < 783, 947 > 941$ or $941 < 947$.
5. If the digit in hundred's place, ten's place as well as one's place is the same in both the numbers, then the two numbers are equal. For example, $658 = 658, 795 = 795$.

Exercise 1.8

Compare the following numbers by writing $</>/=$ between the following numbers:

345	<	461
242		126
387		357
99		100
241		265
736		622
154		81
154		219
325		400

25		17
419		618
536		442
718		729
848		950
435		361
185		700
467		258
356		656

Exercise 1.9

1. Arrange the following numbers from smallest to largest:

178, 456, 283

485, 372, 416

549, 678, 329

286, 239, 742

451, 49, 337

2. Arrange the following numbers from largest to smallest:

154, 785, 382

467, 756, 800

68, 390, 238

8, 600, 458

28, 9, 400

3. Write the largest number with the following digits using each digit once only:

7 and 2

5, 1 and 9

6, 2 and 3

4, 7 and 9

6, 8 and 0

4. Write the smallest number with the following digits using each digit once only:

6 and 8

5 and 7

3, 2 and 9

6, 4 and 7

5, 3 and 0

5. Use the following sets of digits to write all the numbers you can by using each digit once only.

4 and 8.

3 and 6.

2, 5 and 7

3, 2 and 8

9, 0 and 6

UNIT 2

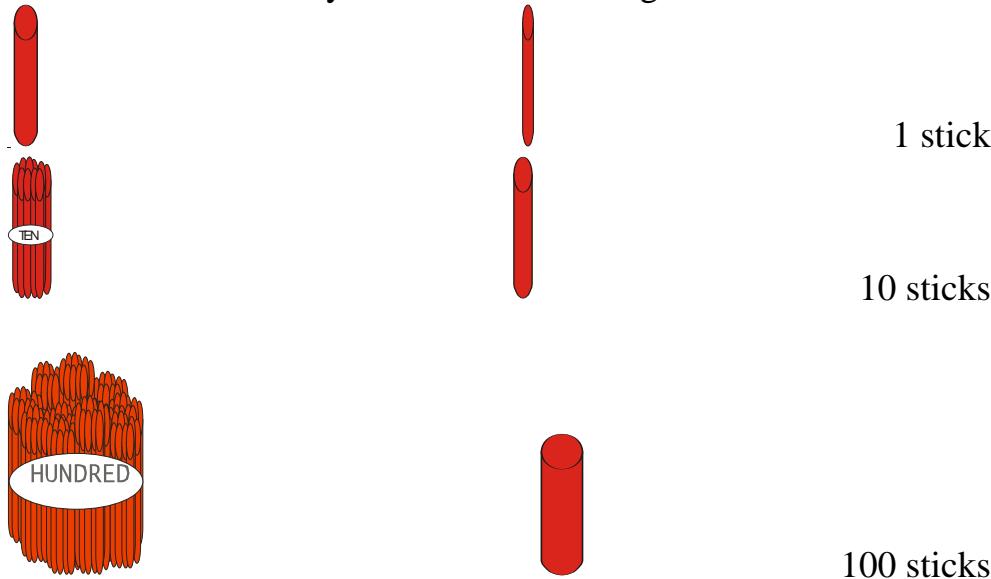
Addition

By now, you should be able to add two one-digit numbers without thinking. Do the mastery test given in Appendix 1 and check if you can do all of them without thinking. If for some of those you are not sure, mark an X under them and learn them.

Addition of three digit numbers that do not require grouping

We have learnt to add two digit numbers. Addition of three-digit numbers requires an additional step of adding hundreds to hundreds.

We can add three digit numbers by using sticks. As using ten bundles of ten sticks to represent hundred sticks would be cumbersome, we will represent one-sticks, ten sticks and hundred sticks by sticks that differ in thickness. We will represent a one stick by a thin stick, a ten stick by a thicker stick and a hundred stick by the thickest stick e.g.



Henceforth we would use sticks that differ in thickness with the rule that 10 one sticks can be exchanged with one ten-stick and 10 ten-sticks can be exchanged with 1 hundred-stick. This is similar to exchanging 1 ten-rupee note for 10 one-rupee notes and 1 hundred-rupee note for 10 ten-rupee notes.

For example to add 135 and 524, we can set aside 1 hundred-stick, 3 ten-sticks and 5 one-sticks for 135 sticks and 5 hundred-sticks, 2 ten-sticks and 4

one-sticks for 524 sticks and combine the two and count the hundred-sticks, ten-sticks and one-sticks in the combined group and find the number.

Number	Hundreds	Tens	Ones
135			
+524			
=659			

As there are 6 hundreds, 5 tens and 9 ones in the combined group, that is the same as 659, therefore $135 + 524 = 659$.

2. Express the numbers in hundreds tens and ones and add the hundreds tens and ones

$$132 = 1 \text{ hundred} + 3 \text{ Tens} + 2 \text{ Ones}$$

$$434 = 4 \text{ hundreds} + 3 \text{ Tens} + 4 \text{ Ones}$$

$$+ 213 = 2 \text{ hundreds} + 1 \text{ Ten} + 3 \text{ Ones}$$

$$= 7 \text{ hundreds} + 7 \text{ Tens} + 9 \text{ Ones} = 779.$$

3. Write H, T, O to denote the places for hundreds, tens and ones respectively. Write the numbers in different rows aligning hundreds with H, and tens with T and the ones with O for all the numbers. Add the ones, tens and hundreds.

H T O

1 3 5

5 2 4

+ 1 2 0

7 7 9

Addition of numbers that have different number of digits

We can add numbers with different digits by

1. Using sticks-Set aside the sticks for the two number using hundred-sticks, ten-sticks and one-sticks and combine the one-sticks, ten-sticks and hundred-sticks. The number of sticks in the combined group gives the sum.
2. Counting forward-to add a one-digit number to a three-digit number counting forward as many numbers as the one-digit number, for example, to add 3 to 254 count forward 3 numbers from 254-255, 256 and 257, as the last number is 257, $254 + 3 = 257$.
To add a two digit and a three digit number, count forward from three digit number by ten as many numbers as the tens in the two digit number and then count forward as many digits as the ones in it. For example, to add 34 to 245, count forward by ten three numbers-255, 265 and 275 and then count forward four numbers-276, 277, 278 and 279. As the last number is 279, $245 + 34 = 279$.
3. Writing the expanded form of the numbers, writing 0 in hundreds for two-digit numbers and 0 in hundreds as well as 0 for tens for one-digit numbers and adding ones to the ones, tens to tens and hundreds to hundreds. For example,
$$\begin{array}{r} 254 = 2 \text{ hundreds} + 5 \text{ tens} + 4 \text{ ones} \\ + 3 = 0 \text{ hundreds} + 0 \text{ tens} + 3 \text{ ones} \\ \hline = 2 \text{ hundreds} + 5 \text{ tens} + 7 \text{ ones} = 257. \end{array}$$

You may also use the short form. Write the numbers in a column aligning the ones with ones, and tens if any with tens. For example,

H T O

$$\begin{array}{r} 245 \\ + 34 \\ \hline 279 \end{array}$$

Exercise 2.1

Add the numbers given below mentally:

$$1. \quad 20 + 40 =$$

$$2. \quad 30 + 50 =$$

$$3. \quad 20 + 50 =$$

$$4. \quad 30 + 4 =$$

$$5. \quad 43 + 5 =$$

$$6. \quad 23 + 34 =$$

$$7. \quad 42 + 27 =$$

$$8. \quad 200 + 300 =$$

$$9. \quad 500 + 300 =$$

$$10. \quad 600 + 25 =$$

$$11. \quad 800 + 50 =$$

$$12. \quad 350 + 40 =$$

$$13. \quad 700 + 70 + 7 =$$

$$14. \quad 300 + 27 =$$

$$15. \quad 524 + 5 =$$

$$16. \quad 420 + 47 =$$

$$17. \quad 342 + 56 =$$

Exercise 2.2

Set aside the following number of sticks using hundred-sticks, ten-sticks and one-sticks, combine the two groups and find the number of sticks in the combined group:

1. 214, 235
2. 243, 352
3. 345, 32
4. 552, 137
5. 970, 28
6. 433, 4
7. 680, 16
8. 435, 324, 240
9. 263, 411, 124
10. 340, 8, 110

Exercise 2.3

Add the following numbers by first writing the numbers in expanded form and adding the ones to ones, tens to tens and hundreds to hundreds.

1. $412 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$
 $+354 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$

 $\underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones} = \underline{\hspace{1cm}}$

2. $735 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$
 $+240 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$

 $\underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones} = \underline{\hspace{1cm}}$

3. $346 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$
 $+623 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$

 $\underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones} = \underline{\hspace{1cm}}$

4. $263 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$
 $+325 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$

 $\underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones} = \underline{\hspace{1cm}}$

5. $245 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$
 $53 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$
 $+ 301 = \underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones}$

 $\underline{\hspace{1cm}} \text{Hundreds } \underline{\hspace{1cm}} \text{Tens} + \underline{\hspace{1cm}} \text{Ones} = \underline{\hspace{1cm}}$

Exercise 2.4

H T O

2 2 3

+4 2 5

1 5 2

+2 4 6

3 1 5

+4 3 2

3 0 0

+2 0 9

5 3 2

2.2 4

+1 2 3

4 7 1

1.0.2

+2 2 6

H.T.O

4 0 7

+3 2 1

5 4 1

+2 4 8

7 4 6

+ 5 2

4 5 6

+3 4 2

1 2 5

5 5 4

+2 1.0

6 2 7

3 4 0

+ 2 2

H T O

6 6 5

+2 3 4

7 5 4

+1 2 3

8 5 4

+1 4 2

6 6 4

+1 2 5

3 2 2

4 0 2

+1 6 2

4 6 1

7

+ 1 1

Addition of three digit numbers that require grouping

1. Using sticks

we first set aside as many sticks using hundred-sticks, ten-sticks and one-sticks for each of the numbers. We then find the sum of one-sticks, ten-sticks and hundred sticks separately. If the sum of one-sticks is ten or more, we exchange as many one sticks as we can with ten-sticks and add that to the sum of ten-sticks of the two numbers. If the sum of ten-sticks is 10 or more, we exchange as many ten-sticks of these as possible with hundred-sticks and add these to the hundred-sticks. For example, to add 245 and 478,

we set aside 2 hundred-sticks, 4 ten-sticks and 5 one-sticks for 245 sticks and 4 hundred-sticks, 7 ten-sticks and 8 one-sticks sticks for 478 sticks (rows 1 and 2 on next page).

When we add the one-sticks, ten-sticks and hundred-sticks we get 13 one-sticks, 11 ten-sticks and 6 hundred-sticks (row 3).

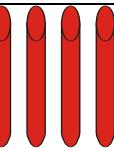
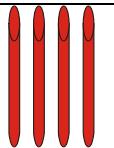
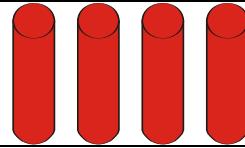
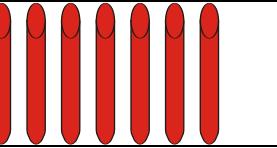
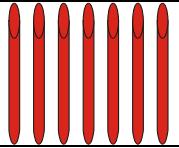
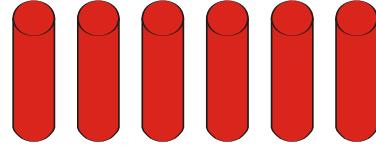
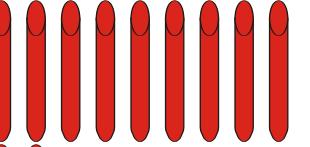
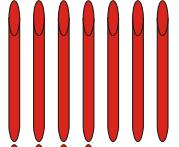
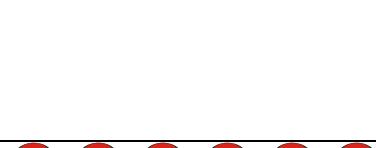
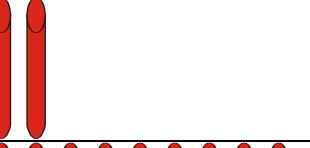
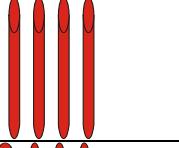
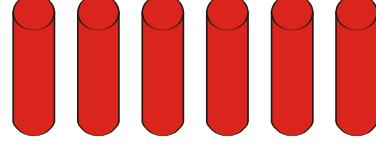
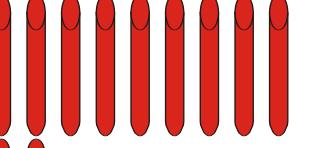
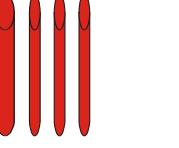
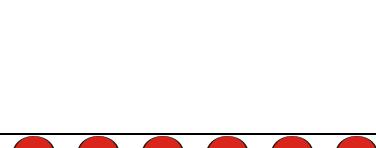
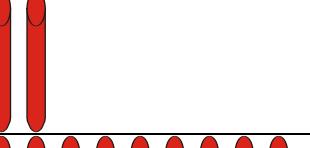
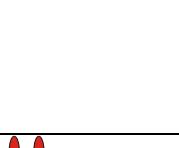
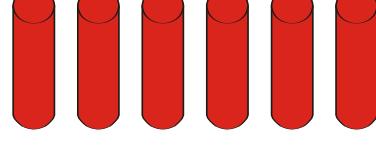
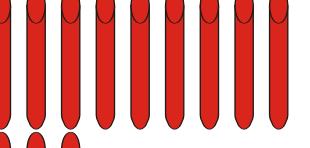
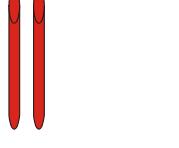
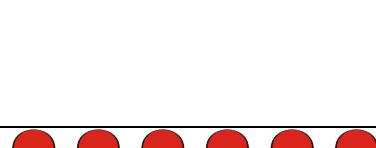
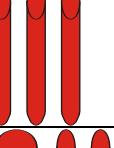
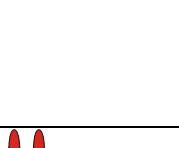
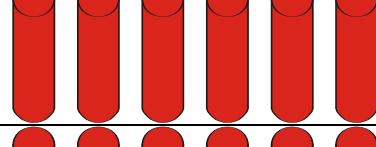
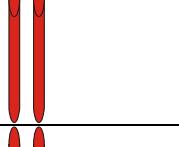
As the number of one-sticks is greater than 10, we exchange 10 of these with 1 ten-stick (row 4).

We add that to the ten sticks which gives 12 ten-sticks (row 5).

As the number of ten sticks is greater than 10, we exchange 10 of these with a hundred-stick (row 6).

We add that to the hundred-sticks (row 7).

As we finally have 7 hundred-sticks, 2 ten-sticks and 3 one-sticks which is the same as 723 sticks. Therefore $245 + 478 = 723$.

Numbers	Hundreds	Tens	Ones
245			
+478			
=			
=			
=			
=			
=			
=			
=			

=723

Express the numbers in expanded form and add the ones, tens and hundreds. If the number of ones is 10 or more, regroup ones to tens and ones. Add the tens to tens. If the number of tens now is 10 or more regroup tens to hundreds and tens and add the hundreds to hundreds. Write the number e.g.

$$245 = 2 \text{ hundreds} + 4 \text{ Tens} + 5 \text{ Ones}$$

$$478 = 4 \text{ hundreds} + 7 \text{ tens} + 8 \text{ Ones}$$

$$+134 = 1 \text{ hundreds} + 3 \text{ tens} + 4 \text{ Ones}$$

$$= 7 \text{ hundreds} + 14 \text{ tens} + 17 \text{ Ones.}$$

$$= 7 \text{ hundreds} + 14 \text{ tens} + 1 \text{ ten} + 7 \text{ ones.}$$

$$= 7 \text{ hundreds} + 15 \text{ tens} + 7 \text{ ones.}$$

$$= 7 \text{ hundreds} + 1 \text{ hundred} + 5 \text{ tens} + 7 \text{ ones.}$$

$$= 8 \text{ hundreds} + 5 \text{ tens} + 7 \text{ ones.}$$

$$= 857.$$

2. Write the numbers so that one's place, ten's place and hundred's place of all the numbers are aligned and draw a line below them.

Add the ones mentally. If the number of ones is 10 or more, regroup these to tens and ones. Write ones in one's place below the line and tens in the ten's place above the numbers to remind you that these are to be added while adding the tens. Add the tens mentally, if the number of tens is 10 or more regroup tens to hundreds and tens and write the tens in ten's place below the line and hundreds in hundred's place above the numbers. Add the hundreds and write in hundred's place below the line.

H T O

 1 1

 2 4 5

 1 5 2

+4 7 8

 8 7 5

Add the ones first that gives 15.

Regroup it as one ten and 5 ones; write 5 in one's place below the line and ten above the numbers in ten's place to remind us another ten is to be added while adding the tens.

Add the tens which give 17 tens.

Regroup it as 1 hundred and 7 tens, write 7 in ten's place below the line and 1 above the numbers in hundred's place to remind us another

hundred is to be added while adding the hundreds

Add the hundreds which gives 8, therefore the sum is 875.

For adding numbers with different digits remember to write zero in hundreds and/or tens while using the expanded form and aligning the numbers on the right while using the short form.

Exercise 2.5

1. Set aside the following number of one-sticks and exchange as many as you can with ten-sticks and write the number of ten-sticks and one-sticks.

1. $14 \text{ one-sticks} = 1 \text{ ten-stick} + 4 \text{ one-sticks}$

2. $17 \text{ one-sticks} = \underline{\hspace{2cm}} \text{ ten-stick} + \underline{\hspace{2cm}} \text{ one-sticks}$

3. $9 \text{ one-sticks} = \underline{\hspace{2cm}} \text{ ten-sticks} + \underline{\hspace{2cm}} \text{ one-sticks}$

4. $23 \text{ one-sticks} = \underline{\hspace{2cm}} \text{ ten-sticks} + \underline{\hspace{2cm}} \text{ one-sticks}$

2. Set aside the following number of ten-sticks and exchange as many as you can with hundred-sticks and write the number of hundred-sticks and ten-sticks

.

1. $45 \text{ ten-sticks} = 4 \text{ hundred-sticks} + 5 \text{ ten-sticks}$

2. $15 \text{ ten-sticks} = \underline{\hspace{2cm}} \text{ hundred-stick} + \underline{\hspace{2cm}} \text{ ten-sticks}$

3. $48 \text{ ten-sticks} = \underline{\hspace{2cm}} \text{ hundred-sticks} + \underline{\hspace{2cm}} \text{ ten-sticks}$

4. $30 \text{ ten-sticks} = \underline{\hspace{2cm}} \text{ hundred-sticks} + \underline{\hspace{2cm}} \text{ ten-sticks}$

3. Set aside the following number of sticks using maximum number of hundred-sticks, ten-sticks and one-sticks and write the number of hundred-sticks, ten-sticks and one-sticks.

1. $263 \text{ sticks} = \underline{\hspace{2cm}} \text{ hundred-sticks} + \underline{\hspace{2cm}} \text{ ten-sticks} + \underline{\hspace{2cm}} \text{ one-sticks}$

2. $586 \text{ sticks} = \underline{\hspace{2cm}} \text{ hundred-sticks} + \underline{\hspace{2cm}} \text{ ten-sticks} + \underline{\hspace{2cm}} \text{ one-sticks}$

3. $680 \text{ sticks} = \underline{\hspace{2cm}} \text{ hundred-sticks} + \underline{\hspace{2cm}} \text{ ten-sticks} + \underline{\hspace{2cm}} \text{ one-sticks}$

4. $400 \text{ sticks} = \underline{\hspace{2cm}} \text{ hundred-sticks} + \underline{\hspace{2cm}} \text{ ten-sticks} + \underline{\hspace{2cm}} \text{ one-sticks}$

4. Set aside the following number of sticks using hundred-sticks, ten-sticks and one-sticks, combine the two groups Find the total number of sticks in the combined group and write it in the box:

1. 414, 238

2. 685, 106

3. 345, 328

4. 586, 137

5. 974, 28

6. 439, 4

7. 243, 357

8. 235, 322, 145

9. 267, 448, 120

10. 390, 457, 78

Exercise 2.6

Fill in the blanks:

1. 16 ones = 1 ten + 6 ones.
2. 10 ones = ____ ten + ____ ones.
3. 23 tens = ____ hundreds + ____ tens
4. 16 tens = ____ hundred + ____ tens
5. 10 tens = ____ hundred + ____ tens

Add the following numbers by first writing the numbers in expanded form and adding the ones, tens and hundreds:

$$\begin{array}{r} 1. \quad 418 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ones} \\ + 354 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ones} \\ \hline = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ones} \end{array}$$

$$\begin{array}{r} 2. \quad 585 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ones} \\ + 240 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ones} \\ \hline = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ones} = \end{array}$$

3. $346 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$
 $+623 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$

 $\underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones} =$

4. $263 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$
 $325 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$
 $+ 146 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$

 $\underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones} =$

5. $245 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$
 $53 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$
 $+527 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$

 $\underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones} =$

6. $345 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$
 $63 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$
 $+437 = \underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones}$

 $\underline{\hspace{2cm}} \text{hundreds } \underline{\hspace{2cm}} \text{tens} + \underline{\hspace{2cm}} \text{ones} =$

7. $313 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$
 $253 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$
 $+327 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$

 $\underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones} =$
8. $45 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$
 $325 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$
 $+571 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$

 $\underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones} =$
9. $273 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$
 $624 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$
 $+27 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$

 $\underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones} =$
10. $624 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$
 $46 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$
 $+327 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$

 $\underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones} =$

$$\begin{array}{l} 11. \quad 431 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \\ \quad \quad 275 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \\ \quad \quad +142 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \end{array}$$

$$\underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} =$$

$$\begin{array}{l} 12. \quad 464 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \\ \quad \quad 289 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \\ \quad \quad +230 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \end{array}$$

$$\underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} =$$

$$\begin{array}{l} 13. \quad 564 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \\ \quad \quad 253 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \\ \quad \quad +146 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \end{array}$$

$$\underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} =$$

$$\begin{array}{l} 14. \quad 313 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \\ \quad \quad 253 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \\ \quad \quad +327 = \underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} \end{array}$$

$$\underline{\hspace{1cm}} \text{hundreds } \underline{\hspace{1cm}} \text{tens } + \underline{\hspace{1cm}} \text{ ones} =$$

Exercise 2.7

Add

H T O

$$\begin{array}{r} 348 \\ +425 \\ \hline \end{array}$$

$$\begin{array}{r} 257 \\ +546 \\ \hline \end{array}$$

$$\begin{array}{r} 365 \\ +438 \\ \hline \end{array}$$

$$\begin{array}{r} 300 \\ 209 \\ +256 \\ \hline \end{array}$$

$$\begin{array}{r} 552 \\ 4.6 \\ 175 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 407 \\ +426 \\ \hline \end{array}$$

$$\begin{array}{r} 444 \\ +248 \\ \hline \end{array}$$

$$\begin{array}{r} 746 \\ +52 \\ \hline \end{array}$$

$$\begin{array}{r} 456 \\ 342 \\ +35 \\ \hline \end{array}$$

$$\begin{array}{r} 554 \\ 21.0 \\ +180 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 665 \\ +238 \\ \hline \end{array}$$

$$\begin{array}{r} 754 \\ +129 \\ \hline \end{array}$$

$$\begin{array}{r} 758 \\ +142 \\ \hline \end{array}$$

$$\begin{array}{r} 464 \\ 125 \\ +132 \\ \hline \end{array}$$

$$\begin{array}{r} 309 \\ 106 \\ +491 \\ \hline \end{array}$$

Exercise 2.8

1. A team made 234 runs in the first inning and 439 runs in the second innings in a cricket match. How many runs did it make in all?
 2. There were 240 men, 227 women and 134 children in a cinema hall. How many people were there in the cinema hall?
 3. There were 674 children watching a match, 43 children from another school came and joined them. How many children are watching the match now?
 4. Anirudh got 70 marks in mathematics, 62 in Hindi and 46 in environmental studies. How many total marks did he get in all these subjects?
 5. Preeti bought a dress for Rs. 125 and shoes for Rs. 240. How much did she spend in all.

Mastery test on addition facts

$$\begin{array}{r} 4 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} 2 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} 3 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} 2 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} 9 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

3	6	8
+4	+7	+6
-----	-----	-----
-----	-----	-----
6	7	6
+4	+8	+9
-----	-----	-----
-----	-----	-----
3	6	5
+7	+5	+7
-----	-----	-----
-----	-----	-----
4	9	8
+6	+6	+5
-----	-----	-----
-----	-----	-----
8	8	8
+4	+9	+8
-----	-----	-----
-----	-----	-----
8	5	5
+3	+9	+3
-----	-----	-----
-----	-----	-----

UNIT 3

Subtraction

By now, you should be able to find subtraction facts without thinking. Check it by doing the Mastery test on subtraction. If you cannot answer any of these immediately, mark an X under those, find them and memorise those.

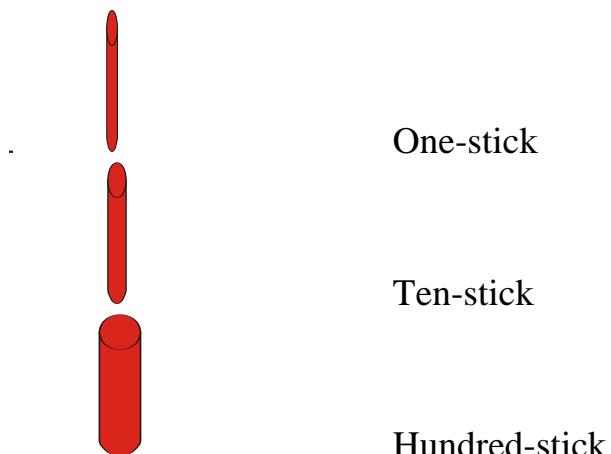
Subtraction of three digit numbers that do not require regrouping

We have learnt to subtract two-digit numbers by using sticks, expanded form and short form. We would now learn to subtract three-digit numbers.

Subtraction of three-digit numbers is similar to subtraction of two-digit numbers except for expressing numbers as hundreds, tens and ones and an additional step of subtracting hundreds from hundreds.

Using sticks

As in addition we will represent hundred-sticks, ten-sticks and one-stick by sticks that differ in thickness with the rule that one ten-stick can be exchanged with 10 one-sticks and a one hundred-stick can be exchanged with 10 ten-sticks. This is similar to exchanging one ten-rupee note for 10 one-rupee notes and one hundred-rupee note for 10 ten-rupee notes.

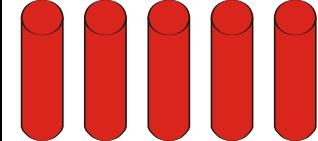
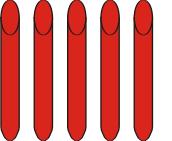
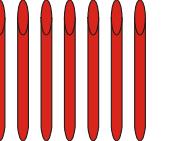
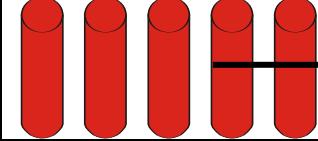
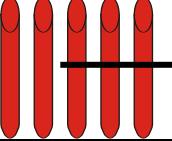
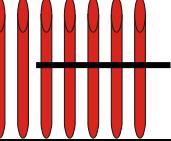
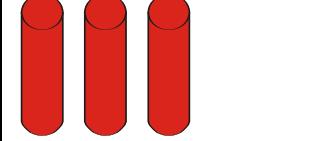
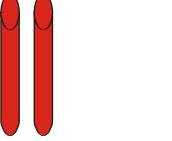
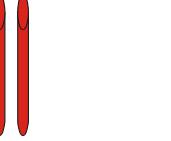


Example 1

Find $528 - 235$

1. To subtract 235 from 528, we set aside 5 hundred-sticks, 2 ten-sticks and 8 one-sticks for 528 sticks.
2. Remove 2 hundred-sticks, 3 ten-sticks and 5 one-sticks for 235 sticks

3. Count the remaining hundred sticks, ten sticks and single sticks.
4. Find the number that is represented by those sticks.

Number	Hundreds	Tens	Ones
Set aside 558			
Remove 235 of these.			
Count remaining sticks = 323			

2. By expressing the numbers in hundred, tens and ones and subtracting the ones from ones and tens from tens, and hundreds from hundreds

$$558 = 5 \text{ hundreds} + 5 \text{ tens} + 8 \text{ ones}$$

$$- 235 = 2 \text{ hundreds} + 3 \text{ tens} + 5 \text{ ones}$$

$$= 3 \text{ hundreds} + 2 \text{ tens} + 3 \text{ ones} = 323$$

3. Write H for Hundreds, T for Tens and O for Ones. Write the number from which a number is to be subtracted and number to be subtracted under it aligning the digits in hundred's, ten's and one's place. Subtract the ones from ones, tens from tens and hundreds from hundreds.

H T O

$$\begin{array}{r} 558 \\ - 235 \\ \hline \end{array}$$

$$\begin{array}{r} 323 \\ \hline \end{array}$$

Subtraction of numbers that have different number of digits

Set aside hundred-sticks, ten-sticks and one-sticks for the larger number and remove only from one-sticks for a one-digit number, from one-sticks and ten-sticks for a two-digit number the appropriate number of sticks.

Or we can write the expanded form of the number writing 0 in hundreds for two-digit numbers and 0 as well as 0 for tens for one-digit numbers and subtract ones from the ones, tens from tens and hundreds from hundreds. For example

$$267 = 2 \text{ hundreds} + 6 \text{ tens} + 7 \text{ ones}$$

$$- 24 = 0 \text{ hundreds} + 2 \text{ tens} + 4 \text{ ones}$$

$$\underline{\underline{= 2 \text{ hundreds} + 4 \text{ tens} + 3 \text{ ones} = 243.}}$$

You may also subtract a one-digit number from a three-digit number by counting back as many numbers as the one-digit number. For example to subtract 3 from 254 count back 3 numbers - 253, 252 and 251, as the last number is 251, therefore $254 - 3 = 251$. For a two digit number you may count back as many numbers as the one digit number and then count back by tens as many digits as the tens in the digit in ten's place. For example to subtract 24 from 267 count back 4 numbers - 266, 265, 264, 263 and then count back by tens 2 times - 253, 243, as the last no is 243, therefore $267 - 24 = 243$.

You may also use the short form, aligning the digits in ten's and one's of the number to be subtracted under the ten's and one's place of the number from which it is to be subtracted.

H T O

2 6 7

- 2 4

2 4 3

Exercise 3.1

Subtract the following by using bundles of hundred-sticks, ten sticks and single sticks:

T O

$$\begin{array}{r} 24 \\ -13 \\ \hline \end{array}$$

H T.O

$$\begin{array}{r} 284 \\ -152 \\ \hline \end{array}$$

H.T.O

$$\begin{array}{r} 967 \\ -47 \\ \hline \end{array}$$

Exercise 3.2

Subtract the following by first expressing the numbers as tens and ones and subtracting the ones from ones and tens from tens:

1. $47 = \underline{\quad}$ tens + $\underline{\quad}$ ones

$-32 = \underline{\quad}$ tens + $\underline{\quad}$ ones

$\underline{\quad}$ tens + $\underline{\quad}$ ones = $\underline{\quad}$

2. $326 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$-114 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$= \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones = $\underline{\quad}$

3. $583 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$-263 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$= \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones = $\underline{\quad}$

4. $454 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$-322 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$= \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones = $\underline{\quad}$

5. $794 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$-424 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$= \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones = $\underline{\quad}$

6. $786 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$-234 = \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones

$= \underline{\quad}$ hundreds $\underline{\quad}$ tens + $\underline{\quad}$ ones = $\underline{\quad}$

7. $649 = \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones
 $-326 = \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones
- $= \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones $= \underline{\hspace{1cm}}$
-
8. $755 = \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones
 $-55 = \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones
- $= \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones $= \underline{\hspace{1cm}}$
-
9. $857 = \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones
 $-243 = \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones
- $= \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones $= \underline{\hspace{1cm}}$
-
10. $453 = \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones
 $-22 = \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones
- $= \underline{\hspace{1cm}}$ hundreds $\underline{\hspace{1cm}}$ tens + $\underline{\hspace{1cm}}$ ones $= \underline{\hspace{1cm}}$
-

Exercise 3.3

Subtract:

$$\begin{array}{r} \text{H T O} \\ 3 9 \\ - 2 4 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 5 8 \\ - 1 4 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 3 4 7 \\ - 2 2 5 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 2 7 6 \\ - 2 0 3 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 3 4 8 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T O} \\ 4 5 5 \\ - 1 3 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 3 8 7 \\ - 2 3 4 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 8 5 7 \\ - 3 2 5 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 3 7.9 \\ - 2 1 6 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 5 4 6 \\ - 1 4 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T O} \\ 7 3 8 \\ - 1 3 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 8 5 5 \\ - 3 3 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 9 9 9 \\ - 6 6 6 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 3 1 7 \\ 1 7 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \hline \\ 6 8 9 \\ - 2 8 \\ \hline \end{array}$$

Subtraction of Three-Digit Numbers that requires grouping

Using sticks

1. Set aside as many sticks as the number from which a number is to be subtracted using hundred, ten and one-sticks.
2. Remove as many one-sticks as the ones in the number to be subtracted if the number of one-sticks to be removed is less than the number of one-sticks set aside for the number.

If the number of one-sticks to be removed is more than the number of one-sticks set aside for the number, remove one ten-stick from ten-sticks and exchange that with 10 one-sticks and add those to one-sticks and remove them now.

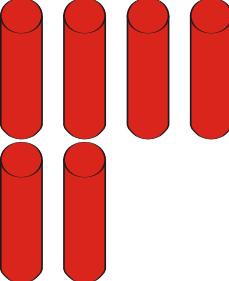
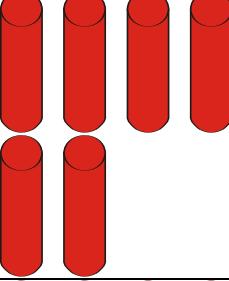
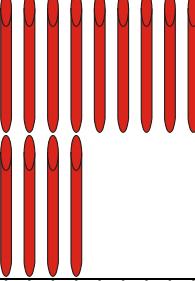
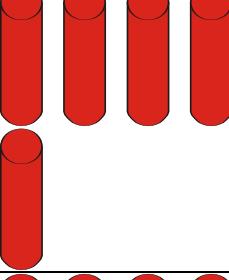
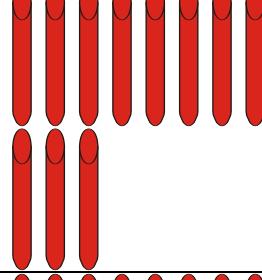
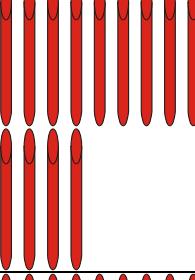
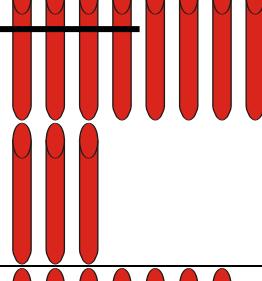
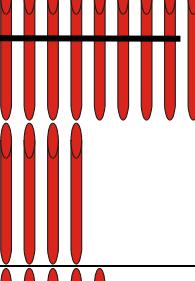
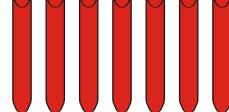
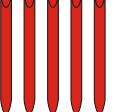
3. Next look at ten-sticks for the number to be subtracted, remove as many ten-sticks as the ones in the number to be subtracted if the number of ten-sticks to be removed is less than the number of ten-sticks set aside or left after exchange for the number.

If the number of ten-sticks to be removed is more than the number of ten-sticks now, exchange one hundred-stick from hundred-sticks with 10 ten-sticks, add those to ten-sticks and remove as many ten-sticks in the number to be subtracted.

4. Finally, remove as many hundred-sticks as the hundreds in the number to be subtracted from the number of hundred-sticks set aside or left after exchange for the number.

For example to subtract 448 from 623

1. We set aside 6 hundred-stick, 2 ten-sticks and 3 one-sticks for 623 sticks (row 1 on next page) and we now have to remove 8 one-sticks, 4 ten-sticks and 4 hundred sticks from these.
2. As we have to remove 8 one-sticks and there are only 3 one-sticks, we take 1 ten-stick from 2 ten-sticks and exchange that with 10 one-sticks and combine those with 3 one-sticks. So we now have 6 hundred-sticks, 1 ten-stick and 13 one-sticks (row 2).
3. We now look at ten-sticks as we want to remove 4 ten-sticks and there is only 1 ten-stick, we exchange 1 hundred-stick for ten-ten sticks from hundred-sticks and add that to ten sticks (row 3).
4. We now have 5 hundred-stick, 11 ten-sticks and 13 one-sticks. We remove 4 hundred-stick, 4 ten-sticks and 8 one-sticks from these (row 4).
5. We now have 1 hundred-stick, 7 ten-sticks and 5 one-sticks that are the same as 175 sticks (row 5), therefore,
 $623 - 448 = 175$.

Number	Hundred-sticks	Ten-sticks	One-sticks
Set aside 623 sticks			
Exchange 1 ten-stick with 10 one sticks and combine that with one-sticks			
Exchange 1 hundred-stick with 10 ten sticks and combine that with ten-sticks			
Remove 4 hundred-sticks, 4 ten-sticks and 8 one-sticks			
Count left over sticks =175			

Use of expanded form

1. Express the numbers in expanded form.

2. If the number of ones to be subtracted is more than the number of ones in the number from which it is to be subtracted, rename one ten as 10 ones and add that to ones and subtract the ones from ones.
3. Now look at tens if the number of tens to be subtracted is more than the number of tens rename one hundred as 10 tens and add that to tens and subtract tens from tens.
4. Subtract hundreds from hundreds.

For example to subtract 448 from 623

1. Express 623 and 448 in expanded form.

$$623 = 6 \text{ hundreds} + 2 \text{ tens} + 3 \text{ ones}$$

$$448 = 4 \text{ hundreds} + 4 \text{ tens} + 8 \text{ ones}$$

2. As we have to subtract 8 ones and there are only 3 ones, we rename 1 ten with ten ones and add that with 3 ones so that

$$623 = 6 \text{ hundreds} + 1 \text{ ten} + 13 \text{ ones}$$
3. We now look at tens as 4 tens are to be subtracted and we have only 1 ten, we rename 1 hundred as 10 tens and add that with 1 ten, so that we have 5 hundreds and 11 tens and 13 ones.
4. We can now subtract ones from ones and tens from tens and hundreds from hundreds

$$623 = 5 \text{ hundreds} + 11 \text{ tens} + 13 \text{ ones}$$

$$- 448 = 4 \text{ hundreds} + 4 \text{ tens} + 8 \text{ ones}$$

$$= 1 \text{ hundred} + 7 \text{ tens} + 5 \text{ ones} = 175$$

Short form

1. Write the numbers aligning ones and tens and hundreds of the two numbers.
2. If the number of ones to be subtracted is more than the number of ones in the number from which it is to be subtracted, rename one ten as 10 ones and correct tens and write 1 before ones to remind us that we have 10 + number of ones. Then subtract the ones from ones and write it under one's place after drawing a line.
3. We next look at tens, if the number of tens to be subtracted is more than the number from which it is to be subtracted, exchange 1 hundred with 10 tens and add that to tens. Correct the hundreds and write 1 before ten's place to remember that there are 10 more tens in ten's place.
 Subtract tens from tens and write it in ten's place below the line in ten's place.

- Subtract the hundreds from hundreds and write it in hundred's place below the line in hundred's place.

For example to subtract 448 from 623

1. Write 623 and 448 below that aligning one's, ten's and hundred's places.

$$\begin{array}{r}
 511 \\
 \cancel{6} \cancel{2} 3 \\
 - 448 \\
 \hline
 175
 \end{array}$$

2. As the number of ones to be subtracted is more than 3, we rename 1 ten as ten ones and correct the tens and ones after grouping by striking off 2 and writing 1 in ten's place and writing 1 before 3 to remind us that we now have 1 ten and 13 ones.
Then subtract the ones from ones, which gives 5, write it under the line in one's place.
3. We next look at tens, as 4 tens are to be subtracted and we have only 1 ten, we rename 1 hundred as 10 tens and add that to 1 ten. We strike off 6 and write 5 in hundred's place 1 in ten's place to remind us that we now have 5 hundreds and 11 tens.
Subtracting 4 tens from 11 tens we get 7 and write it in ten's place below the line.
4. Next subtract 4 hundreds from 5 hundreds which gives 1, write it in hundred's place below the line.

Subtraction from hundreds

Subtract 367 from 700,

To subtract 367 from 700, we think of 700 as 70 tens = 69 tens + 1 ten = 69 tens and 10 ones, that makes the subtraction easier.

$$\begin{array}{r}
 691 \\
 700 \\
 - 367 \\
 \hline
 333
 \end{array}$$

Exercise 3.4

Subtract the following by using hundred-sticks, ten-sticks and one-sticks:

H T O

$$\begin{array}{r} 461 \\ -142 \\ \hline \end{array}$$

H T.O

$$\begin{array}{r} 468 \\ -278 \\ \hline \end{array}$$

H T.O

$$\begin{array}{r} 846 \\ -158 \\ \hline \end{array}$$

$$\begin{array}{r} 492 \\ -287 \\ \hline \end{array}$$

$$\begin{array}{r} 175 \\ -87 \\ \hline \end{array}$$

$$\begin{array}{r} 734 \\ -269 \\ \hline \end{array}$$

$$\begin{array}{r} 493 \\ -247 \\ \hline \end{array}$$

$$\begin{array}{r} 95.2 \\ -367 \\ \hline \end{array}$$

$$\begin{array}{r} 220 \\ -49 \\ \hline \end{array}$$

$$\begin{array}{r} 652 \\ -474 \\ \hline \end{array}$$

$$\begin{array}{r} 832 \\ -57 \\ \hline \end{array}$$

$$\begin{array}{r} 600 \\ -482 \\ \hline \end{array}$$

$$\begin{array}{r} 750 \\ -352 \\ \hline \end{array}$$

$$\begin{array}{r} 782 \\ -239 \\ \hline \end{array}$$

$$\begin{array}{r} 34.6 \\ -38 \\ \hline \end{array}$$

Exercise 3.5

Subtract the following by expressing the numbers in expanded form (as sum of hundreds, tens and ones):

1. $342 - 178$

$$\begin{aligned} .\ 342 &= 3 \text{ hundreds} + 4 \text{ tens} + 2 \text{ ones} = 3 \text{ hundreds} + 3 \text{ tens} + 12 \text{ ones} \\ &= 2 \text{ hundreds} + 13 \text{ tens} + 12 \text{ ones} \\ -178 &= 1 \text{ hundred} + 7 \text{ tens} + 8 \text{ ones} \\ \hline &= 1 \text{ hundred} + 6 \text{ tens} + 4 \text{ ones} = 164 \\ \hline \end{aligned}$$

2. $463 - 135$

3. $853 - 676$

4. $451 - 174$

5. 667 - 289

6. 725 - 278

7. 450 - 274

8. 400 - 248

9. 600 - 57

10. 800 - 582

11. 734 - 478

12.352 – 244

13.526 – 239

14. 335 - 178

15. 442 - 174

Exercise 3.6

Subtract:

H T O

$$\begin{array}{r} 392 \\ -248 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 455 \\ -263 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 738 \\ -164 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 580 \\ -145 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 387 \\ -239 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 855 \\ -83 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 473 \\ -227 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 857 \\ -364 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 6.6.6 \\ -666 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 276 \\ -208 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 373 \\ -286 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 170 \\ -164 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 348 \\ -239 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 546 \\ -177 \\ \hline \end{array}$$

H T O

$$\begin{array}{r} 649 \\ -368 \\ \hline \end{array}$$

Exercise 3.7

1. There were 815 children in a school. If there are 357 girls, how many boys are there?
 2. There were 325 girls and 478 boys in a school. How many children are in there in the school?
 3. There are 347 girls and 432 boys in a school. Are there more girls or boys and how many more?
 4. A fruit seller had 200 oranges. He sold some of those. Now he has 65 oranges. How many oranges did he sell?
 5. A milk dairy had 117 cows. It bought some more cows and now it has 160 cows. How many cows did it buy?
 6. Rajan had 75 rupees. Vinita has 100 rupees. How much more money does Vinita have than Rajan?

7. Raj had 150 rupees. His father gave him 50 rupees. How much money does he have now.

If he bought a shirt for 125 rupees. How much money is left with him?

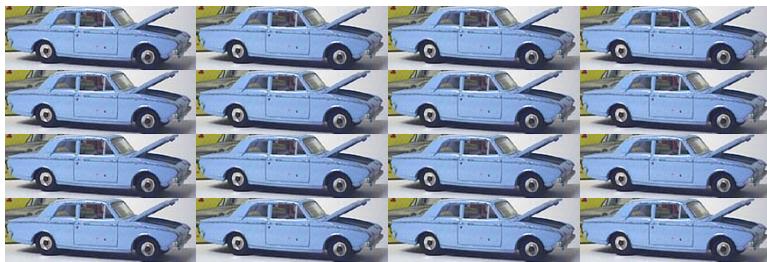
8. There were 43 passengers in a bus. At the next stop 8 got down and 4 got in. How many passengers are there now?
9. Sushma weighed 36 kg. She lost 2 kg in June and 3 kg in July. How much did she weigh at the end of July?
10. Sanjana bought a doll for 65 rupees. If she gave a 100 rupee note to the shopkeeper, how much money he should return to her?

UNIT 4

Multiplication

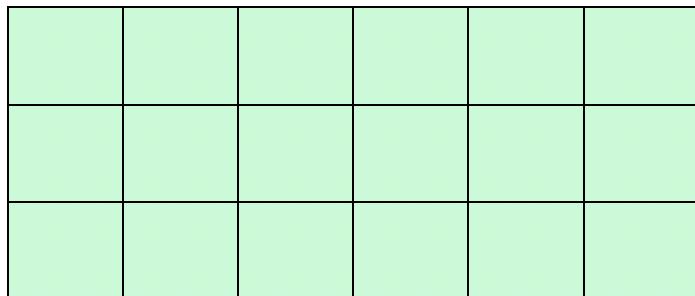
There are many situations in which we need to add the same number many times. For example,

There are 4 cars in a row in a box and there are 4 rows of toy cars and we want to know how many cars are there in all.



There are $4 + 4 + 4 + 4 = 16$ cars

A rectangular region is covered with square tiles so there are 6 tiles in each row and 3 in each column and we want to find out how many square tiles are there in all.



$$6 + 6 + 6 = 18$$

Multiplication is a short way of expressing addition when a number is added to itself a number of times.

We express $2 + 2 + 2 + 2 + 2 = 10$ by $5 \times 2 = 10$, $4 + 4 + 4 + 4 = 16$ by $4 \times 4 = 16$ and $6 + 6 + 6 = 18$ by $3 \times 6 = 18$.

These are read as 5 times 2 = 10, 4 times 4 = 16 and 6 times 3 = 18.

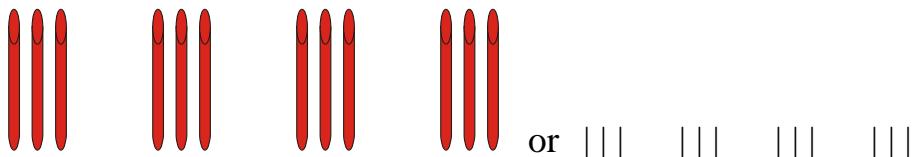
The number that we get after multiplication is called the **product** of two numbers. For example in $3 \times 6 = 18$, 18 is the product of 3 and 6.

The product of two one-digit numbers is called a **multiplication fact**.

Some aids for finding multiplication facts

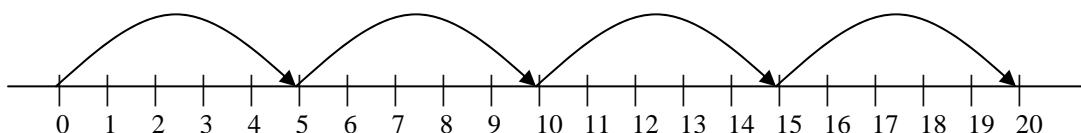
Use of sticks

Set aside as many sticks or draw lines as one of the numbers and as many sets of these as the other number and count all of them. The count gives the product of two numbers. For example to find 4×3 , set aside 4 sets of 3 sticks or draw 4 sets of 3 lines and count all of them. As the count is 12, therefore $4 \times 3 = 12$.



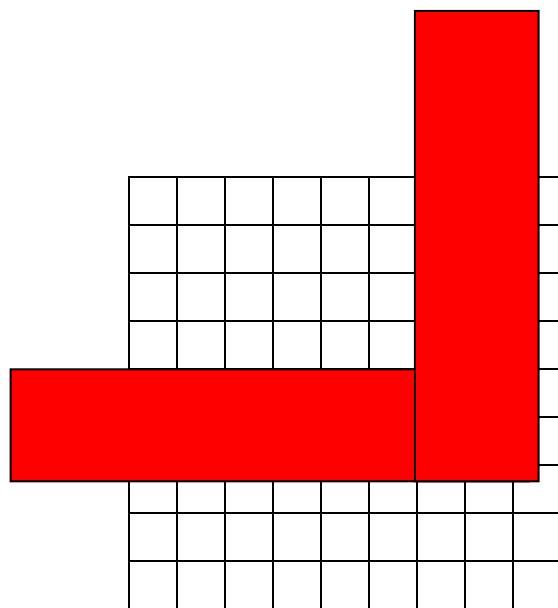
Use of a number line

To find the product of two numbers, say 4 and 5 make 4 hops of 5, the number you land on gives the product 4×5 ; as we landed on 20 after making 4 hops of 5, therefore $4 \times 5 = 20$.



Use of a rectangular model:

A 9×9 square with the help of a L-shaped cover can be used to find the multiplication facts by exposing rows corresponding to one of the numbers and columns corresponding to the other number. For example to find 4×6 , expose 4 rows and 6 columns and count the number of squares which is 24, therefore $4 \times 6 = 24$.



Exercise 4.1

Write the multiplication fact for the following against them:

1. $2 + 2 + 2 + 2 = 4 \times 2$

2. $3 + 3 + 3 =$

3. $5 + 5 + 5 + 5 + 5 + 5 =$

4. $8 + 8 + 8 + 8 + 8 + 8 + 8 =$

5. $1 + 1 + 1 + 1 + 1 =$

6. $7 + 7 + 7 + 7 =$

7. $4 + 4 + 4 + 4 + 4 + 4 + 4 =$

Read the following number facts:

1. $3 \times 7 = 21.$

2. $4 + 5 = 9.$

3. $6 \times 8 = 48.$

4. $14 - 7 = 7.$

5. $5 \times 5 = 25.$

6. $8 \times 9 = 72.$

7. $5 + 7 = 12$

Exercise 4.2

1. If you made 3 sets of 2 sticks, how many sticks did you use? Express it as a multiplication fact.
6, $3 \times 2 = 6$
2. If you have 3 sets of 3 sticks, how many sticks do you have? Express it as a multiplication fact.
3. If you have 2 sets of 4 sticks, how many sticks do you have? Express it as a multiplication fact.
4. How many sets of 2 would give you 8 sticks?
5. How many sets of 5 would give you 25 sticks?
6. Make 3 hops of 5 on the number line which number did you land on?
Express it as a multiplication fact.
7. How many hops of 3 would land you on number 9 on the number line?
Express it as a multiplication fact.
8. Hop by threes on the number line what numbers did you land on?
Express it as a multiplication fact.
9. Hop by fours on the number line what numbers did you land on? Express it as a multiplication fact.
10. Were any of the numbers the same when you hopped by threes and by fours? What does that show?
11. Expose 3 rows and 3 columns of a 9×9 square using the L shaped cover.
How many squares are there? Express it as a multiplication fact.
12. Expose 4 rows and 5 columns, of a 9×9 square using the L shaped cover.
How many squares are there? Express it as a multiplication fact.

14.Expose 6 rows and 3 columns, of a 9×9 square using the L shaped cover. How many squares are there? Express it as a multiplication fact.

15.Suppose you want to form 5 groups of 0 sticks. How many sticks you would need? Express it as a multiplication fact.

16.Suppose you want to form 0 groups of 5 sticks? How many sticks you would need? Express it as a multiplication fact.

17.Name some things that come in

Twos

Threes

Fours

18.If a chair has 4 legs, how many legs would you need to make 4 chairs? Express it as a multiplication fact.

19.If a flower has 6 petals, how many petals will 2 flowers have? Express it as a multiplication fact.

20.If a pencil box has 10 pencils, how many pencils will 6 pencil boxes have? Express it as a multiplication fact.

21.Write stories for the following multiplication facts:

$$2 \times 4 = 8$$

$$3 \times 3 = 9$$

$$6 \times 5 = 30$$

Learning multiplication facts

As in addition learning the products of all two one-digit numbers or multiplication facts together with properties of multiplication and concept of place value would enable us to multiply very large numbers that we need in daily life.

Multiplication by 10

We have already learnt that 2 tens = 20, 3 tens = 30, 4 tens = 40 and so on.

That is $1 \times 10 = 10$, $2 \times 10 = 20$, $3 \times 10 = 30$ and so on

Multiplication Tables

The product of numbers from 1 to 10 with a one-digit number is called a Table of multiplication of that number. We can make it by repeatedly adding that number as many times as the other number e.g.

Table of 4

4	$1 \times 4 = 4$
$4 + 4$	$2 \times 4 = 8$
$4 + 4 + 4$	$3 \times 4 = 12$
$4 + 4 + 4 + 4$	$4 \times 4 = 16$
$4 + 4 + 4 + 4 + 4$	$5 \times 4 = 20$
$4 + 4 + 4 + 4 + 4 + 4$	$6 \times 4 = 24$
$4 + 4 + 4 + 4 + 4 + 4 + 4$	$7 \times 4 = 28$
$4 + 4 + 4 + 4 + 4 + 4 + 4 + 4$	$8 \times 4 = 32$
$4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4$	$9 \times 4 = 36$
$4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4$	$10 \times 4 = 40$

Use of a table of Hundred

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Highlight every fourth number up to 40, and read the highlighted numbers. These are 4, 8, 12, 16, 20, 24, 28, 32, 36 and 40. These are the same as you would land on if you skipped by 4 on a number line from 1 to 10 times beginning with 4. These are also the same as products of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 4 in order in a table of 4. We can thus find 5×4 by counting by four 5 numbers. The last number gives 5×4 or product of 5 and 4. For example to find 5×4 , count 5 numbers by 4 – 4, 8, 12, 16 and 20. Since the last number is 20, therefore $5 \times 4 = 20$.

The product of all numbers from 1 to 10 with a number is called a table of that number.

We can thus complete the table of four as follows:

$$1 \times 4 = 4 \quad 2 \times 4 = 8 \quad 3 \times 4 = 12 \quad 4 \times 4 = 16 \quad 5 \times 4 = 20$$

$$6 \times 4 = 24 \quad 7 \times 4 = 28 \quad 8 \times 4 = 32 \quad 9 \times 4 = 36 \quad 10 \times 4 = 40$$

Similarly we can make tables of other numbers 2, 3, 5, 6, 7, 8, 9 and 10 by

highlighting with a different colour or using a different mark under every second, third, fifth, sixth, seventh, eighth, ninth and tenth number in a hundred's table.

Tables of 2, 10, 3 and 5.

Skip counting by 10, 2, 5 and 3 we get the following tables:

$1 \times 10 = 10$	$1 \times 2 = 2$	$1 \times 5 = 5$	$1 \times 3 = 3$
$2 \times 10 = 20$	$2 \times 2 = 4$	$2 \times 5 = 10$	$2 \times 3 = 6$
$3 \times 10 = 30$	$3 \times 2 = 6$	$3 \times 5 = 15$	$3 \times 3 = 9$
$4 \times 10 = 40$	$4 \times 2 = 8$	$4 \times 5 = 20$	$4 \times 3 = 12$
$5 \times 10 = 50$	$5 \times 2 = 10$	$5 \times 5 = 25$	$5 \times 3 = 15$
$6 \times 10 = 60$	$6 \times 2 = 12$	$6 \times 5 = 30$	$6 \times 3 = 18$
$7 \times 10 = 70$	$7 \times 2 = 14$	$7 \times 5 = 35$	$7 \times 3 = 21$
$8 \times 10 = 80$	$8 \times 2 = 16$	$8 \times 5 = 40$	$8 \times 3 = 24$
$9 \times 10 = 90$	$9 \times 2 = 18$	$9 \times 5 = 45$	$9 \times 3 = 27$
$10 \times 10 = 100$	$10 \times 2 = 20$	$10 \times 5 = 50$	$10 \times 3 = 30$

Tables of 6, 7, 8, and 9

Skip counting by 6, 7, 8 and 9 we get the following tables:

$$1 \times 6 = 6$$

$$1 \times 7 = 7$$

$$1 \times 8 = 8$$

$$1 \times 9 = 9$$

$$2 \times 6 = 12$$

$$2 \times 7 = 14$$

$$2 \times 8 = 16$$

$$2 \times 9 = 18$$

$$3 \times 6 = 18$$

$$3 \times 7 = 21$$

$$3 \times 8 = 24$$

$$3 \times 9 = 27$$

$$4 \times 6 = 24$$

$$4 \times 7 = 28$$

$$4 \times 8 = 32$$

$$4 \times 9 = 36$$

$$5 \times 6 = 30$$

$$5 \times 7 = 35$$

$$5 \times 8 = 40$$

$$5 \times 9 = 45$$

$$6 \times 6 = 36$$

$$6 \times 7 = 42$$

$$6 \times 8 = 48$$

$$6 \times 9 = 54$$

$$7 \times 6 = 42$$

$$7 \times 7 = 49$$

$$7 \times 8 = 56$$

$$7 \times 9 = 63$$

$$8 \times 6 = 48$$

$$8 \times 7 = 56$$

$$8 \times 8 = 64$$

$$8 \times 9 = 72$$

$$9 \times 6 = 54$$

$$9 \times 7 = 63$$

$$9 \times 8 = 72$$

$$9 \times 9 = 81$$

$$10 \times 6 = 60$$

$$10 \times 7 = 70$$

$$10 \times 8 = 80$$

$$10 \times 9 = 90$$

Multiplication by zero

A bookshop gives 2 stickers to a child buying a chocolate from it.
On Sunday 7 children bought chocolates. How many stickers did the store give to children?

The store gave 14 stickers, as $7 \times 2 = 14$.

On Monday no child bought a chocolate. How many stickers did the store give to children?

The store did not give any that is the same as 0 stickers, therefore $0 \times 2 = 0$.

Study the pattern given below and find the last product:

$$5 \times 5 = 25$$

$$5 \times 4 = 20$$

$$5 \times 3 = 15$$

$$5 \times 2 = 10$$

$$5 \times 1 = 5$$

$$5 \times 0 =$$

As the numbers are decreasing by 5, the last number will be $5 - 5 = 0$.

Similarly looking at the pattern of other tables we can see that any number multiplied by zero is zero.

The product of any number and zero is zero.

Exercise 4.3

1. Write the numbers you say when you skip count by twos up to 20.

What do you notice about these numbers?

2. Write the numbers you say when you skip count by fives up to 50.

What do you notice about the number in the one's place?

3. Write the numbers you say when you skip count by threes up to 30.

4. Write the numbers you say when you skip count by fours up to 40.

5. Write the numbers you say when you skip count by sixes up to 60.

6. Write the numbers you say when you skip count by sevens up to 70.

7. Write the numbers you say when you skip count by eights up to 80.

8. Write the numbers you say when you skip count by 9 up to 90.

What do you notice about the sum of the digits in the products?

9. Write the numbers you say when you skip count by 10 up to 100.

What do you notice about the number in the tens place?

10. What tables have only even products? [2, 4, 6, 8, -----]

11. Write a table of 1.

What is special about this table?

12. Write a table of 0.

What is special about this table?

Use a multiplication table

It summarises all the tables in one table and is handy till you can recall multiplication facts from memory.

Multiplication Table

\times	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

Each row gives the product of the number at the beginning of the row with the number at the top of the column.

The first row gives the product of different numbers and 0. Note that product of any number and 0 is zero.

The second row gives the product of different numbers and 1. Note that product of any number and 1 is that number.

The third row gives the product of different numbers and 2.

The fourth row gives the product of different numbers and 3, and so on.

The numbers in the cells with red borders are the product of a number with itself.

We can find a specific multiplication fact by highlighting a row with one of the numbers at the beginning of the row and a column with other number at the top of the column. The number in the cell in which the highlighted row and column meet gives the product of the two numbers.

For example, to find 8×4 , we highlight the row with number 8 at the beginning of the row and a column with number 4 at the top of the column. As the cell in which highlighted row and column meet has 32 in it, the product of 8 and 4 is 32 or $8 \times 4 = 32$.

A Property of Multiplication

Verify the following using any of the aids for multiplication:

$$2 \times 3 = 3 \times 2$$

$$4 \times 5 = 5 \times 4$$

$$4 \times 1 = 1 \times 4$$

$$3 \times 4 = 4 \times 3$$

The order of numbers in a multiplication does not matter.

This reduces the number of multiplication facts that we have to learn. We can use this property to find other multiplication facts from the ones that we know. For example if we know that $2 \times 6 = 12$, we can find out 6×2 which would also equal 12. We only have to learn the facts above or below the cells with red borders and those in the cells with red borders.

Exercise 4.4

Some aids for finding multiplication are given in Appendix I
Multiply the following using any of the aids given there

$$\begin{array}{r} 3 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

Exercise 4.5

Skip count by 10, 2 and 5 and find the following multiplication facts:

$$1 \times 10 = 10$$

$$1 \times 2 = 2$$

$$1 \times 5 = 5$$

$$2 \times 10 =$$

$$2 \times 2 =$$

$$2 \times 5 =$$

$$3 \times 10 =$$

$$3 \times 2 =$$

$$3 \times 5 =$$

$$4 \times 10 =$$

$$4 \times 2 =$$

$$4 \times 5 =$$

$$5 \times 10 =$$

$$5 \times 2 =$$

$$5 \times 5 =$$

$$6 \times 10 =$$

$$6 \times 2 =$$

$$6 \times 5 =$$

$$7 \times 10 =$$

$$7 \times 2 =$$

$$7 \times 5 =$$

$$8 \times 10 =$$

$$8 \times 2 =$$

$$8 \times 5 =$$

$$9 \times 10 =$$

$$9 \times 2 =$$

$$9 \times 5 =$$

$$10 \times 10 =$$

$$10 \times 2 =$$

$$10 \times 5 =$$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Highlight every third number up to 30 in the table given above.

What numbers do you say when you skip count by threes to 30.

Write products of numbers 1 to 10 with 3.

Highlight every sixth, seventh, eighth and ninth number with a different colour or mark a ✓ below every sixth number, an X below every seventh number, draw a line below every eighth number and mark a * below every ninth number. Write products of numbers 1 to 10 with 6, 7, 8 and 9 on next page.

$1 \times 6 = 6$

$1 \times 7 = 7$

$1 \times 8 = 8$

$1 \times 9 = 9$

$2 \times 6 =$

$2 \times 7 =$

$2 \times 8 =$

$2 \times 9 =$

$3 \times 6 =$

$3 \times 7 =$

$3 \times 8 =$

$3 \times 9 =$

$4 \times 6 =$

$4 \times 7 =$

$4 \times 8 =$

$4 \times 9 =$

$5 \times 6 =$

$5 \times 7 =$

$5 \times 8 =$

$5 \times 9 =$

$6 \times 6 =$

$6 \times 7 =$

$6 \times 8 =$

$6 \times 9 =$

$7 \times 6 =$

$7 \times 7 =$

$7 \times 8 =$

$7 \times 9 =$

$8 \times 6 =$

$8 \times 7 =$

$8 \times 8 =$

$8 \times 9 =$

$9 \times 6 =$

$9 \times 7 =$

$9 \times 8 =$

$9 \times 9 =$

$10 \times 6 =$

$10 \times 7 =$

$10 \times 8 =$

$10 \times 9 =$

Exercise 4.6

Multiply

$$\begin{array}{r} 1 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 0 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 5 \\ \hline \end{array} \qquad \begin{array}{r} 3 \\ \times 8 \\ \hline \end{array} \qquad \begin{array}{r} 5 \\ \times 3 \\ \hline \end{array}$$
$$\begin{array}{r} 2 \\ \times 3 \\ \hline \end{array} \qquad \begin{array}{r} 5 \\ \times 7 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$$
$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array} \qquad \begin{array}{r} 2 \\ \times 9 \\ \hline \end{array} \qquad \begin{array}{r} 7 \\ \times 2 \\ \hline \end{array}$$
$$\begin{array}{r} 2 \\ \times 7 \\ \hline \end{array} \qquad \begin{array}{r} 5 \\ \times 3 \\ \hline \end{array} \qquad \begin{array}{r} 3 \\ \times 7 \\ \hline \end{array}$$
$$\begin{array}{r} 5 \\ \times 3 \\ \hline \end{array} \qquad \begin{array}{r} 3 \\ \times 4 \\ \hline \end{array} \qquad \begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$$
$$\begin{array}{r} 4 \\ \times 3 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ \times 4 \\ \hline \end{array} \qquad \begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ \times 0 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 0 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

Exercise 4.7

Multiplication Table Format

1. What numbers will go in the left column? (0-9)
2. What numbers will go in the top row? (0-9)
3. Where would you put a multiplication sign?

4. In what row on the multiplication chart you would write the products of 2 and another number?
5. In what column on the multiplication chart you would write the products of 5 and another number?
6. Do you know all the multiples of the numbers 0, 1, 2 and 5? Enter them into the table given above.
7. How can we show that 2×6 has the same product as 6×2 ? How can knowing this help you learn the multiplication facts?
8. What is the product of 4×3 ? What other number pairs have the same product?
9. Learn a few multiplication facts every day. After you have learnt a few multiplication facts enter them into your multiplication format chart. When you have learnt all the multiplication facts do the test on next page. You should be able to write these without thinking.

Mastery Test in Multiplication Facts

Multiply

$$\begin{array}{r} 6 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 0 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

Multiplication of two and three-digit numbers by one digit numbers

Multiplying ten by a one-digit number

We can multiply a number by 10 by counting as many numbers by ten. The last number gives the product. For example, to multiply 6 by 10, count 6 numbers by ten-10, 20, 30, 40, 50, 60, as the last number is 60, $6 \times 10 = 60 = 6$ tens.

The product of any number and ten is as many tens as the number.

$$\begin{array}{lll} 1 \times 10 = 10 & 4 \times 10 = 40 & 7 \times 10 = 70 \\ 2 \times 10 = 20 & 5 \times 10 = 50 & 8 \times 10 = 80 \\ 3 \times 10 = 30 & 6 \times 10 = 60 & 9 \times 10 = 90 \end{array}$$

Multiplying a number of tens by a one-digit number

The product of a number of tens and a one-digit number is as many tens as the product of number of tens and one-digit. For example to multiply 3 tens $\times 2 = 6$ tens, we first find 3×2 which gives 6, the product is 6 tens, similarly 4 tens $\times 3 = 12$ tens, 5 tens $\times 6 = 30$ tens.

Multiplication of a two-digit number with one-digit number without regrouping

We can multiply a two-digit number by a one-digit number by writing the two-digit number in expanded form and first multiplying the ones with the one-digit number and then the tens with ten-digit number and adding the two. For example, to multiply 23 by 3, write

$$\begin{array}{r} 23 = 2 \text{ Tens} + 3 \text{ Ones} \\ \times 3 \qquad \qquad \times 3 \\ \hline \\ \qquad \qquad \qquad = 6 \text{ Tens} + 9 \text{ Ones} = 69. \end{array}$$

Multiplication of a two-digit number with one-digit number with regrouping

The number of ones is more than 10 in the product of ones with ones we need to regroup them into tens and ones and add the tens to product of tens. If that is more than 10 tens, we regroup it into hundreds and tens in the

product like we have been doing in addition. For example to multiply

$$\begin{array}{r} 46 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} \\ \hline \end{array}$$

we write

$$\begin{array}{r} 46 = 4 \text{ Tens} + 6 \text{ Ones} \\ \times 4 \qquad \qquad \qquad 4 \\ \hline \end{array}$$

$$\begin{aligned} &= 16 \text{ Tens} + 24 \text{ Ones} \\ &= 16 \text{ Tens} + 2 \text{ Tens} + 4 \text{ Ones} \\ &= 18 \text{ Tens} + 4 \text{ Ones} \\ &= 1 \text{ Hundred} + 8 \text{ Tens} + 4 \text{ Ones} \\ &= 184. \end{aligned}$$

Multiplying a number of hundreds by a one-digit number

The product of a number of hundreds and a one-digit number is as many hundreds as the product of the digit and number of hundreds. For example 4 hundreds $\times 3 = 4 \times 3$ hundreds = 12 hundreds.

Multiplication of a three-digit number with one-digit number without regrouping

We can multiply a three-digit number by a one-digit number by writing the three-digit number in expanded form and multiplying the ones, tens and the hundreds in that order with the one-digit number and adding all of them. For example, to multiply 342 by 2, write

$$\begin{array}{r} 342 = 3 \text{ Hundreds} + 4 \text{ Tens} + 2 \text{ Ones} \\ \times 2 \qquad \qquad \qquad \times 2 \\ \hline \\ = 6 \text{ Hundreds} + 8 \text{ Tens} + 4 \text{ Ones} = 684. \\ \hline \end{array}$$

Multiplication of a three-digit number with one-digit number with regrouping

We can multiply a three-digit number by a one-digit number by writing the three-digit number in expanded form and multiplying the ones, tens and the hundreds in that order with the one-digit number. The number of ones is

more than 10 in the product of ones with ones we need to regroup them into tens and ones and add the tens to product of tens. If that is more than 10 tens, we regroup it into hundreds and tens and add the hundreds to product of hundreds in the product. If the number of hundreds is more than ten, we regroup it into thousands like we have been doing in addition. For example, to multiply 453×4 , we write 453 as

$$\begin{array}{r} 243 = 2 \text{ Hundreds} + 4 \text{ Tens} + 3 \text{ Ones} \\ \times 4 \\ \hline \end{array}$$

$$\begin{aligned} &= 8 \text{ Hundreds} + 16 \text{ Tens} + 12 \text{ Ones} \\ &= 8 \text{ Hundreds} + 16 \text{ Tens} + 1 \text{ Ten} + 2 \text{ Ones} \\ &= 8 \text{ Hundreds} + 17 \text{ Tens} + 2 \text{ Ones} \\ &= 8 \text{ Hundreds} + 1 \text{ Hundreds} + 7 \text{ Tens} + 2 \text{ Ones} \\ &= 9 \text{ Hundreds} + 7 \text{ Tens} + 2 \text{ Ones} \\ &= 972 \end{aligned}$$

Exercise 4.8

1. Fill in the blanks

$$4 \times 0 = 0$$

$$6 \times 0 = \underline{\quad}$$

$$7 \times 0 = \underline{\quad}$$

$$10 \times 0 = \underline{\quad}$$

$$3 \text{ tens} \times 3 = 9 \text{ tens} = 90$$

$$6 \text{ tens} \times 5 = \underline{\quad} \text{ tens} =$$

$$7 \text{ tens} \times 3 = \underline{\quad} \text{ tens} =$$

$$12 \text{ Tens} = \underline{\quad} \text{ Hundred} + \underline{\quad} \text{Tens}$$

$$37 \text{ Tens} = \underline{\quad} \text{ Hundreds} + \underline{\quad} \text{Tens}$$

$$56 \text{ Tens} = \underline{\quad} \text{ Hundreds} + \underline{\quad} \text{Tens}$$

$$4 \text{ Hundreds} + 7 \text{ Tens} + 3 \text{ Ones} = \underline{\quad}$$

$$2 \text{ Hundreds} + 4 \text{ Tens} + 2 \text{ Ones} = \underline{\quad}$$

$$7 \text{ Hundreds} + 6 \text{ Tens} + 4 \text{ Ones} = \underline{\quad}$$

$$9 \text{ Hundreds} + 4 \text{ Tens} + 6 \text{ Ones} = \underline{\quad}$$

2. $63 = 3 \text{ Tens} + 3 \text{ Ones}$

$$\times 2 \qquad \qquad \times 2$$

$$= 12 \text{ Tens} + 6 \text{ Ones}$$

$$= 1 \text{ Hundred} + 2 \text{ Tens} + 6 \text{ Ones}$$

$$= 126$$

$$\begin{array}{r} 3. \quad 22 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 45 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 60 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 17 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 24 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 56 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 84 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 76 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 67 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 56 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \ 35 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \ 70 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \ 26 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \ 47 \\ \times 8 \\ \hline \end{array}$$

Exercise 4.9

1. Namita needs 4 beads to decorate a hair band. How many beads would she need for decorating 4 hair bands?
 2. A notebook costs 3 rupees. How much money do you need for buying 6 notebooks?
 3. There are 10 pencils in a box. How many pencils would be there in 6 boxes?
 4. A week has 7 days, how many days are there in 24 weeks?
 5. A packet of candles contains 20 candles. Raj bought 5 packets, how many candles did he have?
 6. An egg carton holds 12 eggs. How many eggs would 2 cartons hold?

7. A school hall has 145 benches. If 6 students can sit on a bench. How many students can be seated in the hall

8. A carpenter needs 4 legs to make a chair, if he has an order from a school for 124 chairs. How many legs would he need?

9. Rajan bought 4 notebooks each costing 3 rupees and a pencil box costing 15 rupees. How much money he should pay to the shopkeeper.

10. Arti bought 3 pens each costing 6 rupees. If she paid a 20-rupee note to the shopkeeper, how much money the shopkeeper should return to her?

UNIT 5

Division

Division

There are many situations in which we want to make equal groups of a given size from a number of objects and want to know how many groups would be there. For example, there are 6 laddoos and we wanted to give 2 laddoos to each and we want to know how many children can have it. In this case we go on giving 2 laddoos to each child till no laddoos are left. How many children will get it? (3)

There are other situations in which we need to share a number of objects equally among a given number of persons and we want to find the share of each person.

There are 12 toffees and we wanted to distribute it equally between four children. How many toffees each child got? We give one to each child, then another one and so on till all the toffees are finished. How many toffees will each get? (3)

We express these by $6 \div 2 = 3$ and $12 \div 4 = 3$

We read it as 6 divided by 2 is equal to 3 and 12 divided by 4 is equal to 3

The number that is divided is called the **dividend**, the number by which it is divided is called the **divisor**, the number that results is called **quotient** and \div is the sign of division. For example, in $12 \div 4 = 3$, 12 is the dividend, 4 is the divisor and 3 the quotient.

Division facts

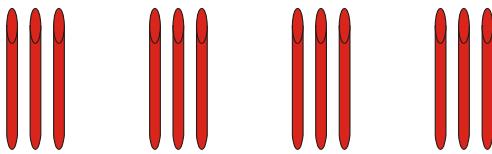
Division is the inverse of multiplication $7 \times 4 = 28 \rightarrow 28 \div 4 = 7$ and $28 \div 7 = 4$.

The division facts that correspond to multiplication facts (multiplication of two one-digit numbers) are called **division facts**.

Aids for finding division facts

Use of sticks

Set aside as many sticks the total number of objects to be shared and make sets of size as the divisor and count the number of sets. For example to find $12 \div 3$, set aside 12 sticks and make sets of 3 sticks and count the number of sets which is 4, therefore $12 \div 3 = 4$.

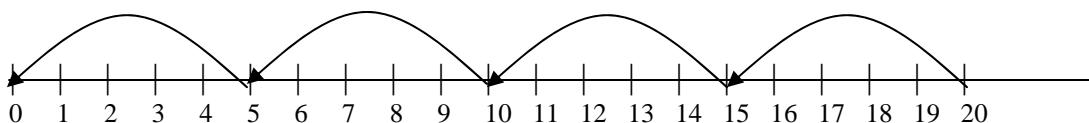


Or draw 12 lines, and encircle 3 lines to make a set and count the number of sets which is 4, therefore $12 \div 3 = 4$.



Use of a number line

To find $20 \div 5$, start at 20 and hop by 5 backwards and count the number of hops. As there are 4 hops, $20 \div 5 = 4$.



Repeated subtraction

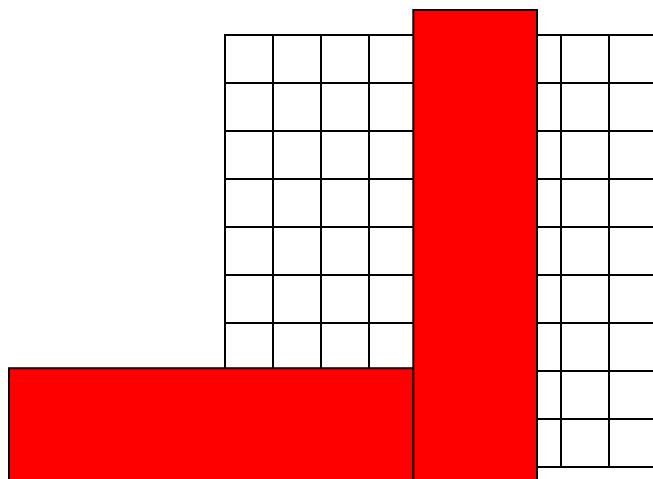
To find $10 \div 2$, we go on subtracting 2 till we reach 0 and count how many times we subtracted.

$$\begin{array}{r}
 10 \\
 - 2 \\
 \hline
 8 & (1) \\
 - 2 \\
 \hline
 6 & (2) \\
 - 2 \\
 \hline
 4 & (3) \\
 - 2 \\
 \hline
 2 & (4) \\
 - 2 \\
 \hline
 0 & (5)
 \end{array}$$

As we could subtract 2 five times, $10 \div 2 = 5$

Use of a rectangular model:

A 10×10 square with the help of a L-shaped cover can be used to find the division facts by exposing rows corresponding to the divisor and exposing columns one by one and counting the squares till you find as many squares as the dividend. The number of columns gives the quotient. For example to find $28 \div 7$, we begin with exposing 7 rows and 1 column that exposes 7 squares, exposing two columns gives 14 squares, exposing 3 columns gives 21 squares and exposing 4 columns gives 28 squares equal to the dividend. As we need to expose 4 columns starting with as many rows as the divisor to get 28, therefore $28 \div 7 = 4$.



Use of Multiplication table

We can find the division facts from the multiplication table as follows: Highlight the numbers in the row corresponding to the divisor till you find the dividend and highlight the column above that cell. Read the number given in the first row of that column, it gives the quotient. For example, to find $56 \div 8$, highlight the 8th row till you find the cell with 56, then highlight the column above 56 and read the number in the first row of that column, which gives the quotient. As the column number is 7, therefore $56 \div 8 = 7$.

Multiplication Table

\times	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

Exercise 5.1

1. Write the division facts for the following against them:

15

- 5

10

- 5

5

- 5

0

6

- 3

3

- 3

0

2. $7 \times 3 = 21$

$21 \div 3 =$

$21 \div 7 =$

$8 \times 6 = 48$

$48 \div 6 =$

$48 \div 8 =$

$5 \times 9 = 45$

$45 \div 9 =$

$45 \div 5 =$

$9 \times 7 = 63$

$63 \div 7 =$

$63 \div 9 =$

$6 \times 6 = 36$

$36 \div 6 =$

$8 \times 7 = 56$

$56 \div 7 =$

$56 \div 8 =$

$9 \times 9 = 81$

$81 \div 9 =$

3. Read the following number facts:

$$21 \div 7 = 3$$

$$25 \div 5 = 5$$

$$42 \div 7 = 6$$

$$36 \div 6 = 6$$

4. Set aside 25 sticks and make sets of 5. How many sets of 5 sticks do you have? Express it as a division fact.
5. Set aside 8 sticks and make sets of 2. How many sets of 2 do you have? Express it as a division fact.
6. Set aside 24 sticks and make sets of 4. How many sets of 4 sticks do you have? Express it as a division fact.
7. Set aside 12 sticks and distribute these in 4 equal heaps of sticks. How many sticks are there in each heap? Express it as a division fact.
8. Set aside 42 sticks and distribute these in 6 equal heaps of sticks. How many sticks are there in each heap? Express it as a division fact.
9. Start at number 9 on the number line and make hops of 3 backward on the number line. How many hops landed you on 0? Express it as a division fact.
10. Start at number 16 on the number line and make hops of 4 backward on the number line. How many hops landed you on 0? Express it as a division fact.
11. If there are 12 oranges and you want to give 2 oranges to each person, how many persons can you give it to? Express it as a division fact.

12.If you want to distribute 30 sweets equally among 6 children how many will each get? Express it as a division fact.

13.Use the multiplication table given in Activity sheet 5.1 to divide the following:

$$8 \div 2 =$$

$$12 \div 4 =$$

$$9 \div 3 =$$

$$16 \div 4 =$$

$$14 \div 2 =$$

$$18 \div 3 =$$

$$20 \div 5 =$$

$$24 \div 6 =$$

$$14 \div 7 =$$

$$24 \div 8 =$$

$$27 \div 9 =$$

$$42 \div 7 =$$

$$30 \div 6 =$$

$$56 \div 7 =$$

$$63 \div 9 =$$

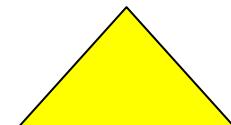
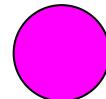
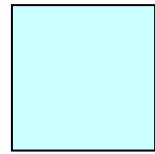
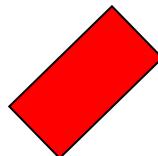
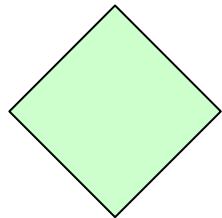
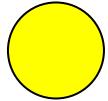
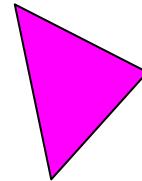
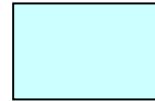
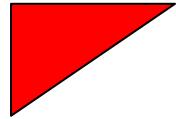
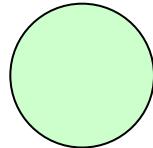
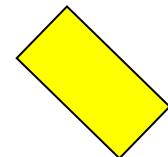
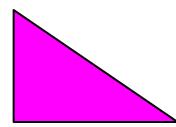
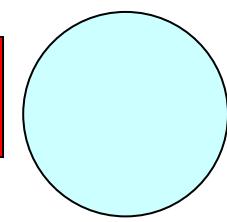
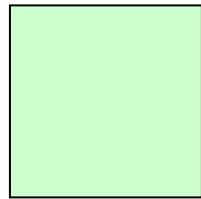
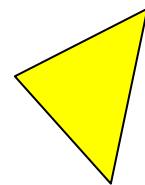
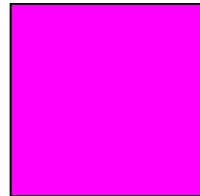
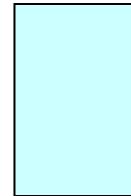
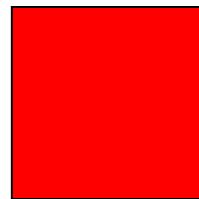
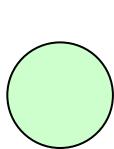
$$48 \div 6 =$$

UNIT 6

Geometry

Two-Dimensional (2-D) Figures

Some 2-D figures are given below:



Which of these are squares? Write S below them. How are they similar?
(Four sides, four corners of the same shape, all sides are equal.)

Which of these are rectangles? Write R below them.

How are they similar? (Four sides, four corners of the same shape, opposite sides are equal.)

Triangles

Which of these are triangles? Write T below them.

How are they similar? (Three sides, three corners)

Activity 6.1

Cut triangles from Activity Sheet 6.1 and make others shapes with these.

Can you build a square with these?

Can you build a bigger triangle with these?

What else can you build with these?

Glue the shapes you could make in your notebook and name them.

Activity 6.2

Cut squares from Activity Sheet 6.1

In how many ways you can cut it into two equal pieces.

How can you check the two pieces are equal?

In how many ways you can cut it into four equal pieces.

Can you cut it into 4 equal squares? Describe how.

Can you cut it into 4 equal triangles? Describe how.

Can you cut it into 4 equal rectangles? Describe how.

Glue the shapes you could make in your notebook and name the shapes.

Cut rectangles from Activity Sheet 6.1 and find what others shapes can you make by cutting rectangles and name the shapes.

Glue the shapes you could make in your notebook.

How are a square and rectangle alike?

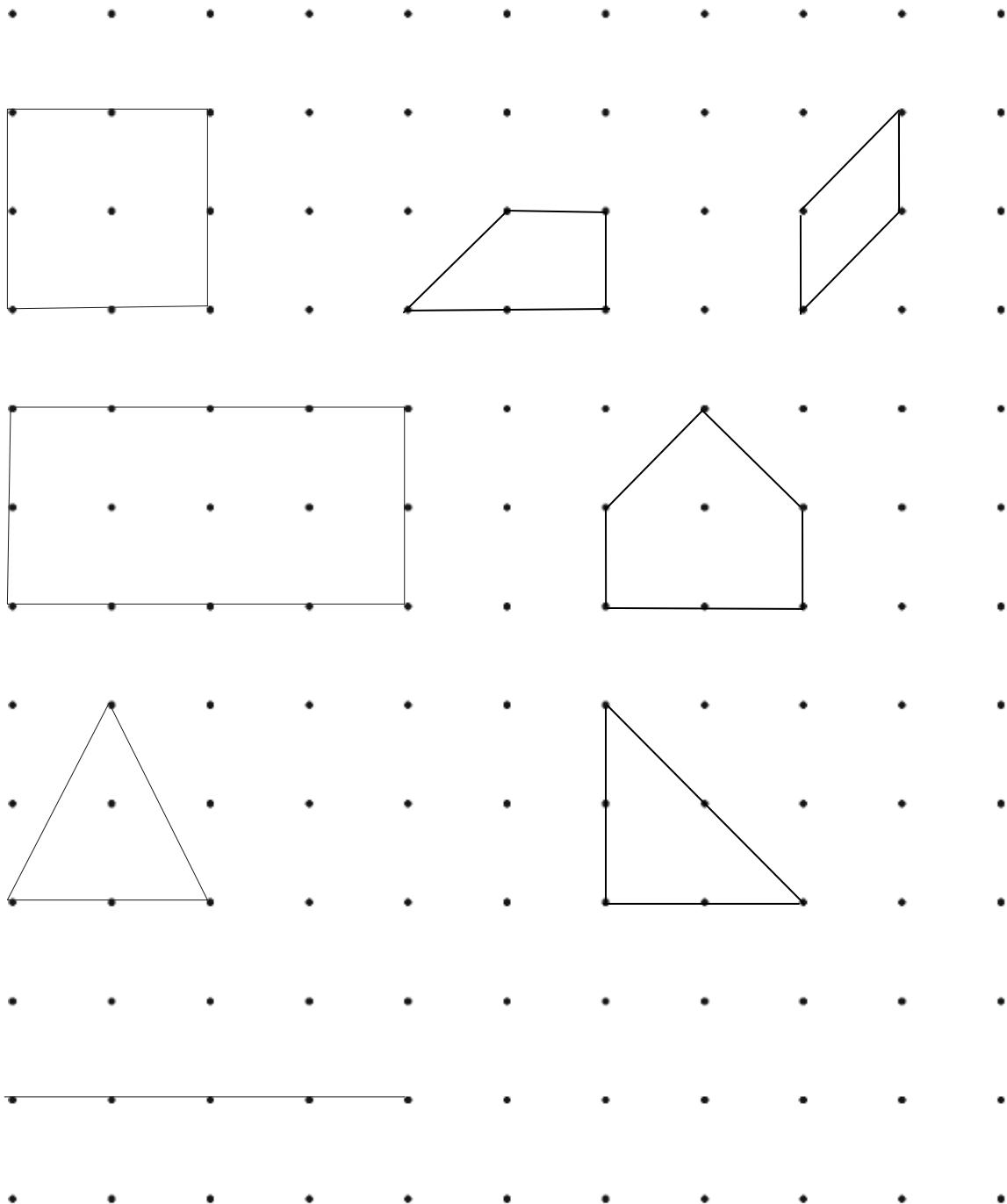
How are a square and rectangle different?

How are a square and triangle alike?

How are a square and triangle different?

Activity 6.3

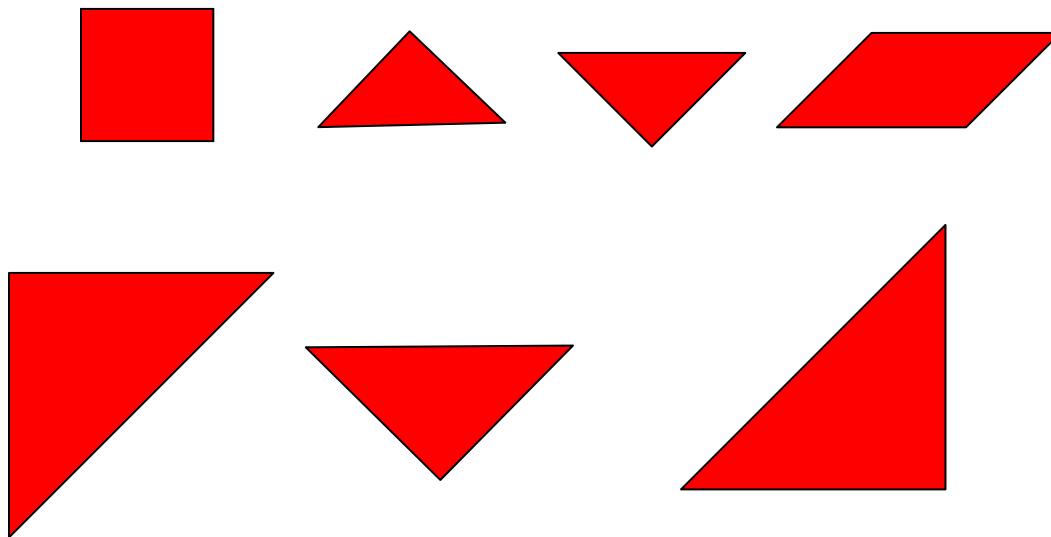
Make the shapes given below on a Geo Board or Copy these on a dot paper:



Make some new shapes on Geoboard or Dot paper.
Copy shapes made by other students.

Tangram

A **tangram** is an old Chinese puzzle and consists of seven tangram pieces



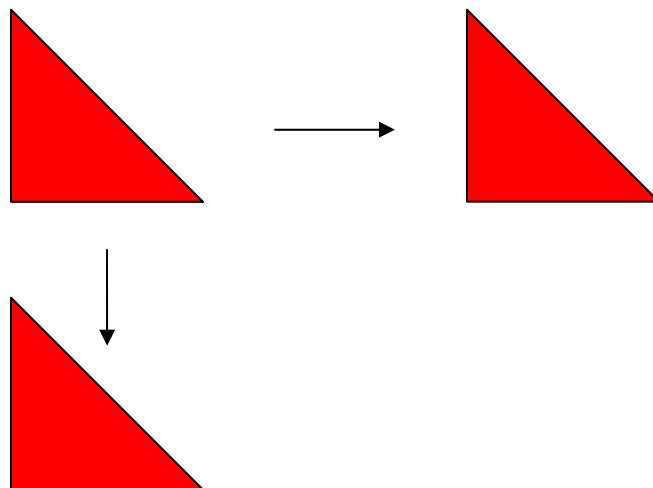
If you do not have a tangram, you can make these pieces by pasting the figure given in Activity Sheet 6.3 on a cardboard, and cutting the pieces. Identify the shape of different pieces.

You can make many shapes with these.

Flips, slides and Turns

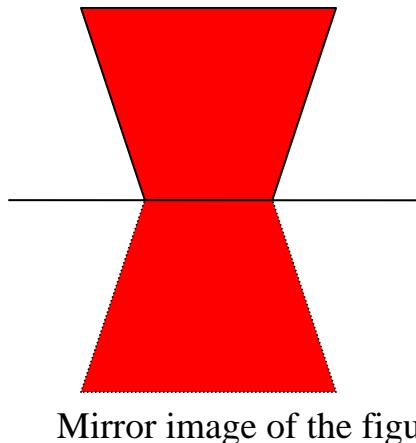
We can move a figure in many ways. It does not change the size and shape of the figure.

Slides move figures along a horizontal or vertical line without changing the way it looks.



Slide different tangram pieces and trace around them.

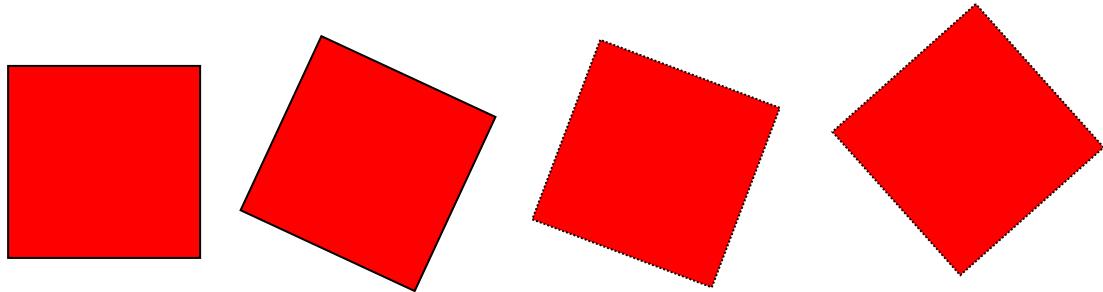
A flip produce a mirror image of a figure. It is also called a reflection.



Mirror image of the figure

Flip different tangram pieces along a side and trace around them.

A **Turn** is rotating a figure about a point.



Turn different tangram pieces around a corner and trace around them.

Activity 6.4

Make the following shapes by using tangram pieces it may require sliding, flipping and rotating some pieces:

A square with two tangram pieces

A square with three tangram pieces

A square with four tangram pieces

Make a square with five tangram pieces

Make a square with all the seven tangram pieces

Make a triangle with all the seven pieces

Make a rectangle with all the seven pieces

Make a parallelogram with all the seven pieces

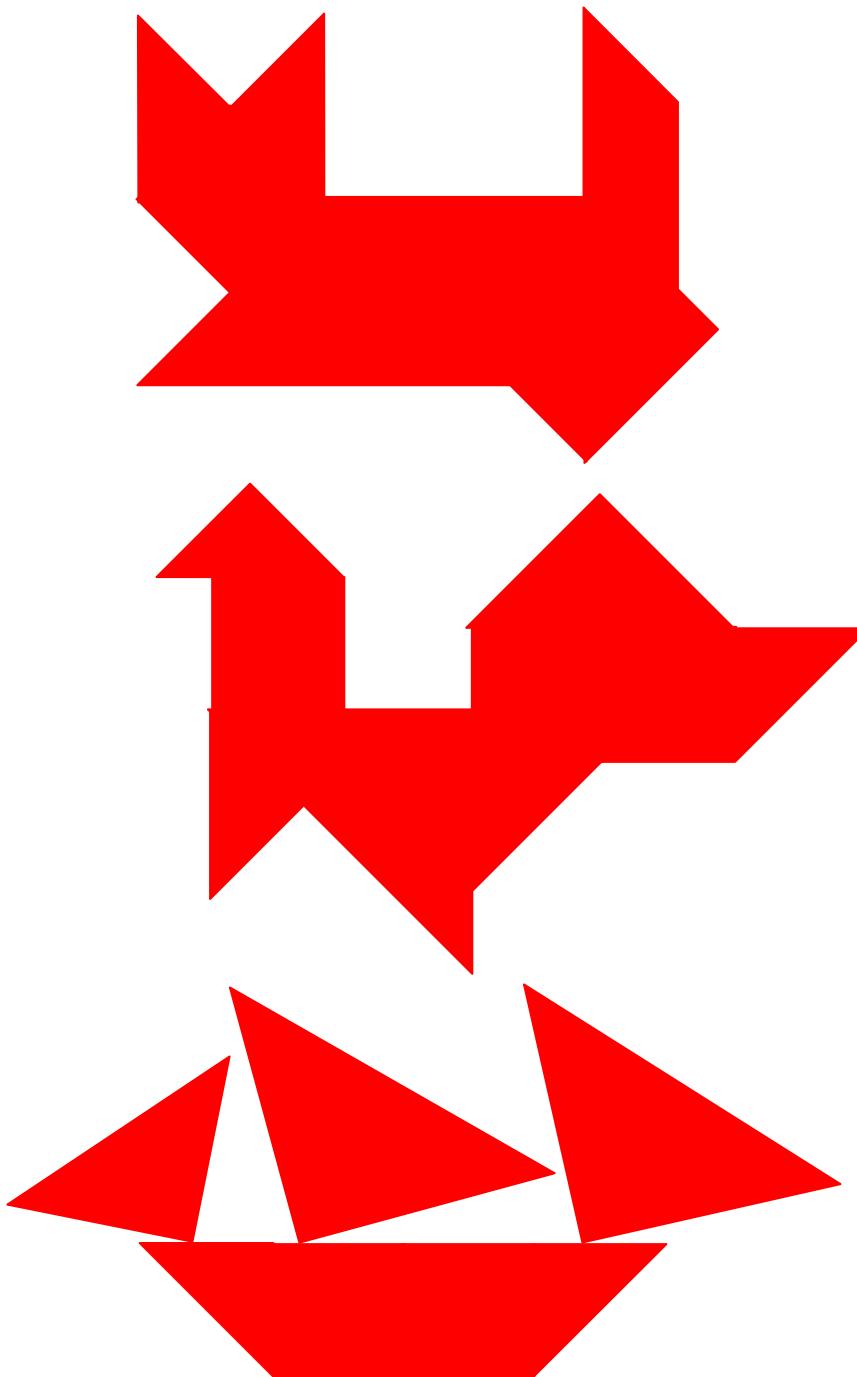
The students may work in small groups for some of these.
Ask them where they used a flip, a turn or a rotation.

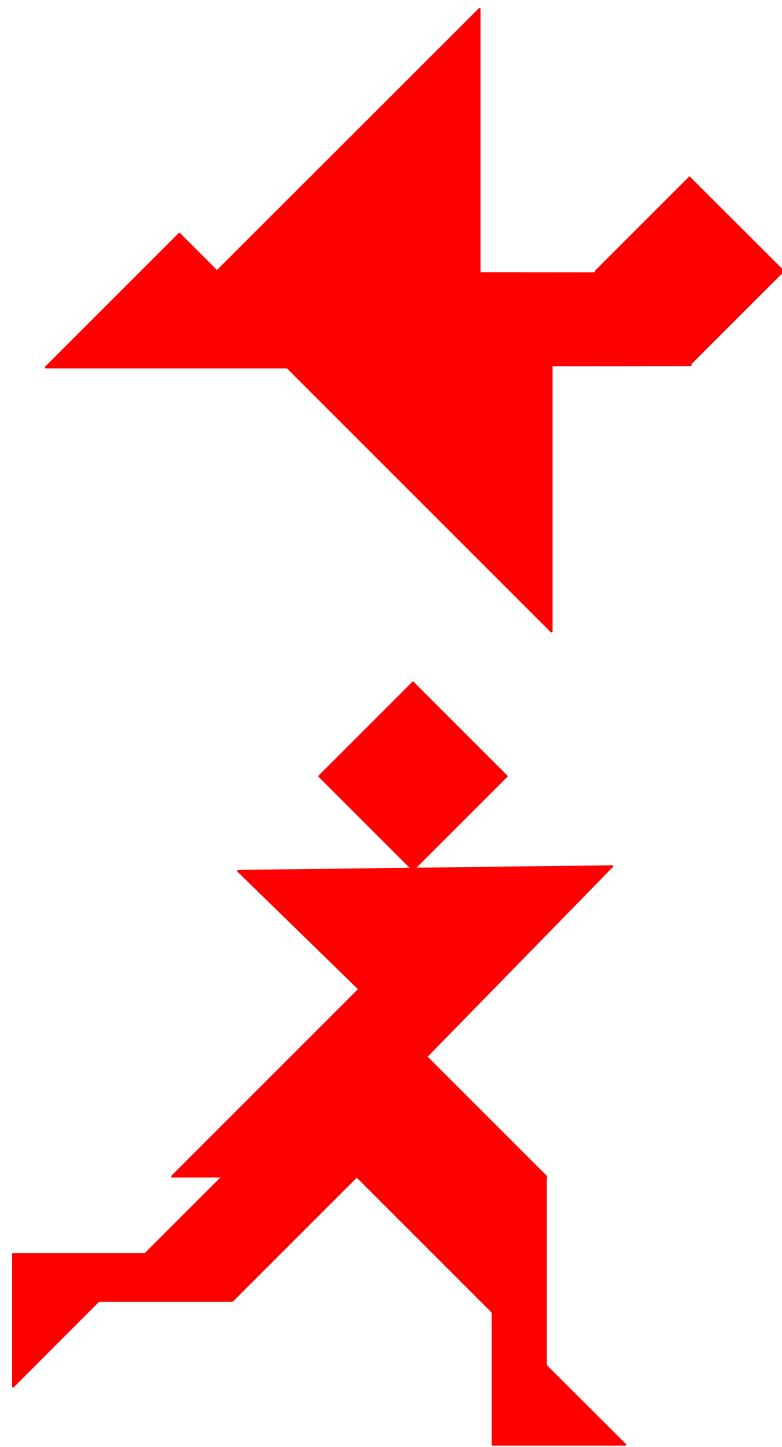
Make the shapes given below:

Tangram puzzles

Activity 6.5

Make shapes given below using all the seven pieces:





If children have access to computer ask them to go to the websites given below and fill in the outlines of figures using all tangram pieces that may require sliding, flipping or rotation of different pieces on the computer.

<http://pbs.kids.org/sagva/games/tangrams/index.html>

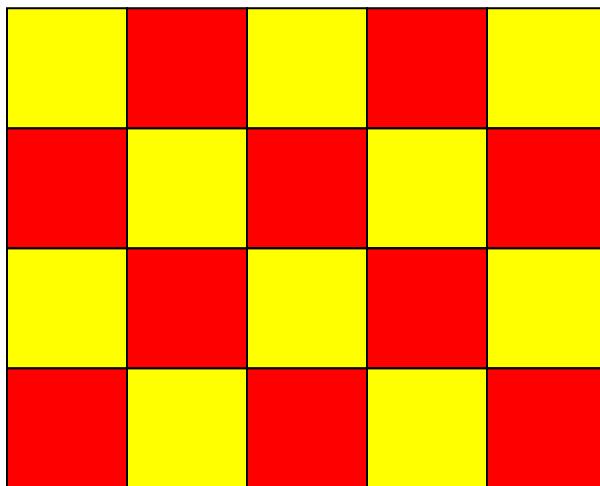
<http://standards.nctm.org/document/eexample/chap4/4.4/standalone1.htm>

Tiling a region

You would have seen many floors with tiles. What shapes had been used for those?

Tiling refers to filling a surface by shapes so that there are no overlaps or holes. It may not fill the corners.

We can tile a page by drawing around a square chip or tangram piece, sliding the square so that its edge is along the side of square and drawing around it again and continuing in this manner until the whole page is tiled. We may colour alternate squares yellow and red. The page would look like



Activity 6.6

Tile a page by a parallelogram. Ask them where they used a flip, a turn or a rotation.

Repeat it with a rectangle.

Can you tile a page by triangle so that there are no gaps or overlaps? (rotate or flip the triangular piece). If yes, tile it, if no, why?

Can you tile a surface by circles? If yes, tile it, if no, why?

Can you tile a surface by ovals? If yes, tile it, if no, why?

Reading maps

Give directions for coming to the class room from the main gate.

Give directions for going to the principal's office from your class room.

Activity 6.7-Reading maps

Give them a map of part of a village or a colony or garden or zoo children visited recently and ask them to find their way starting from a place to different places on the map.



Ask questions like

Give directions for going to a particular enclosure from entrance.

Give directions for going from one enclosure to the other or to the restaurant for refreshments or to the toilet rooms.

Draw and use maps

Draw maps of a school yard including some landmarks. The students can then use landmarks to write directions for finding hidden objects at some places there.

3-D objects

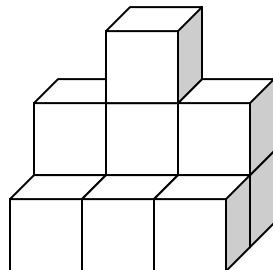
Activity 6.8-Building towers and structures with blocks

Ask them to bring from home three dimensional objects such as empty boxes, cans, ice cream cups, funnels etc and build a tower with these.

- Record the height of the tower and objects used.

- Write a report on building with three dimensional objects. Give information such as shapes that were best at the bottom and top of the tower, the best way to position boxes and cans and the objects that would be best for large and low buildings.

The figure given below gives a structure made with blocks. Copy it.

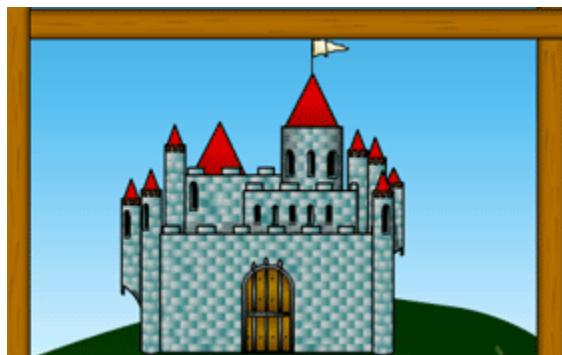


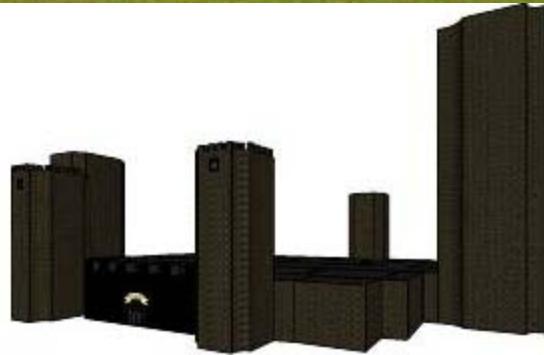
Make Three Dimensional structures with blocks.

Make structures with given number of blocks.

Copy structures made by others with blocks.

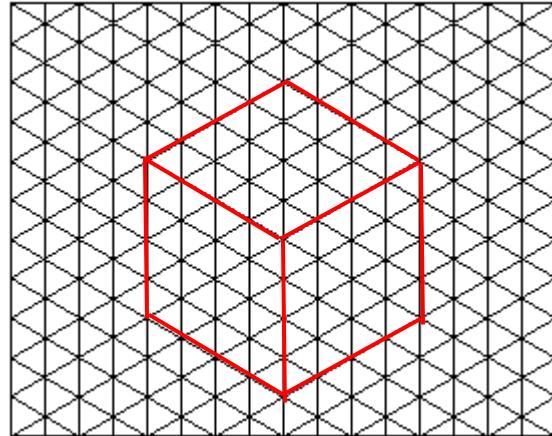
Show them pictures of some castles and then ask them to design and create a 3-D drawing of their own castle, using geometric solids. You should have at least one each of the four solids we have studied: cube, cuboid, cylinder, and cone.





Draw 3-D objects in 2-D

We can draw a 3D drawing by using **isometric grid** given in Activity 6.6
The figure given below shows a cube drawn on it.

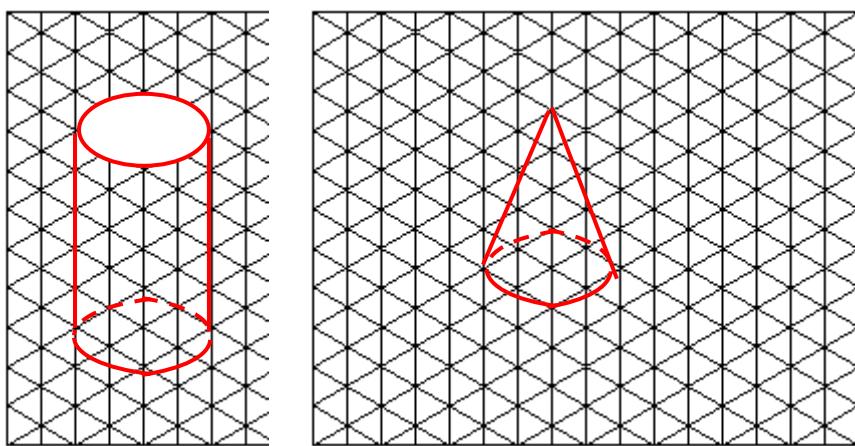


Begin with simple shapes and then combine shapes to form more complex drawings.

You can use an isometric grid to draw many different shapes.

Examples of different geometric shapes drawn on isometric grids:

Sometimes in order to draw a particular shape you need to draw lines that don't fall right on the grid and/or curved portions e.g. for a cylinder or cone. The dashed lines show the hidden faces.



Activity 6.9

Draw a cuboid, a cone and a cylinder of a size different than given in the book.

Make other shapes and copy the shapes made by others.

UNIT 7

Money

We use money for buying things, paying bus fare, paying school fees among other uses. Indian money is in **rupees**. The worth of a note or coin is called its denomination. Notes are available in denomination of one, two, five, ten, twenty, fifty, hundred, five hundred and thousand. Rupees 1, 2 and 5 are available in coins also. Tell your parents to show you the coins and notes of various denominations if you have not seen them or do not recognize them. We also have coins of smaller denomination in **paise**. One rupee is the same as 100 paise. The coin used to come in the denomination of 1 paisa, 2 paise, 5 paise, 10 paise, 20 paise, 25 paise and 50 paise; however these are not used anymore due to inflation. However, the cost of many things involves both rupees and paise. For example, the price of gas is 331 rupees and 65 paise. These are written in short form as Rs.331.65, where the amount before the dot denotes rupees and that after the dot denotes paise. The paise in short form is always written as two-digit number. If the number of paise is 1, 2, 3, 9, we write it as 01, 02, 03 09. For example, 13 rupees and 50 paise will be written as 13.50 and 13 rupees and 5 paise will be written as 13.05.

Rounding off to nearest rupee

For buying or selling that involves both rupee and paise, we round off the money to the nearest rupee. If the paise involved are less than 50, we pay only the rupee part and if it is more than 50, we pay one rupee more for the paise. We will round off Rs.700.25 to Rs.700, Rs.247.80 to Rs.249 and Rs.140.50 to Rs.141

Conversion of rupees to paise and paise to rupees

We can convert a number of rupees to paise by counting by 100 as many numbers as the rupees. For example,

1 rupee = 100 paise

2 rupees = 200 paise

3 rupees = 300 paise

9 rupees = 900 paise

Rs.5.50 = 5 rupees and 50 paise = 500 paise + 50 paise = 550 paise

Rs.7.25 = 7 rupees and 25 paise = 700 paise + 25 paise = 725 paise

We can convert a number of paise to rupees by writing it as sum of hundreds + two digit number and writing it-as many rupees as the hundreds and as many paise as the two digit number. For example,

350 paise = 300 paise + 50 paise = 3 rupees and 50 paise = Rs.3.50

823 paise = 800 paise + 23 paise = 8 rupees and 23 paise = Rs.8.23

708 paise = 700 paise + 8 paise = 7 rupees and 8 paise = Rs.7.08

Exercise 7.1

1. How many paise coins does a rupee have?

2. Convert the paise given below to rupees:

100 paise = _____ rupees

200 paise = _____ rupees

300 paise = _____ rupees

600 paise = _____ rupees

800 paise = _____ rupees

125 paise = _____ rupees and _____ paise

250 paise = _____ rupees and _____ paise

325 paise = _____ rupees and _____ paise

470 paise = _____ rupees and _____ paise

3. Convert the following rupees to paise:

1 rupee = _____ paise

2 rupees = _____ paise

7 rupees = _____ paise

1 rupee and 50 paise = _____ paise

5 rupees and 70 paise = _____ paise

4. Round off the following to the nearest rupee:

26 rupees and 25 paise

13 rupees and 72 paise

104 rupees and 50 paise

80 rupees and 90 paise

Addition, subtraction and multiplication of rupees and paise

Rupees can be added to rupees, subtracted from rupees or multiplied by a number in the same manner as numbers, only the sum, difference or product is in rupees as we have been doing earlier in word problems. If the amounts involve both rupees and paise, then we add rupees to rupees and paise to paise. If the number of paise after addition or multiplication is more than 100, we convert those to rupees remembering that 100 paise is the same as 1 rupee, 200 paise is the same as 2 rupees, and 300 paise is the same as 3 rupees and so on. We then add that to rupees. If in subtraction the number of paise to be subtracted is more, we exchange a rupee from rupees for 100 paise, and reduce the rupees by 1 and increase the paise by 100 and then subtract rupees from rupees and paise from paise.

Example 1

Add

$$\begin{array}{r} 1 \\ 356 \text{ rupees and } 80 \text{ paise} \\ +135 \text{ rupees and } 70 \text{ paise} \\ \hline \end{array}$$

491 rupees and 150 paise, which is the same as
491 rupees and 1 rupee and 50 paise, which is the same as,
492 rupees and 50 paise

Example 2

Subtract

$$\begin{array}{r} 400 \text{ rupees} \\ -240 \text{ rupees and } 50 \text{ paise} \\ \hline \end{array}$$

Since we cannot subtract 50 paise from 0 paise, we take away 1 rupee from 400 rupees and convert that to 100 paise. We can now write 400 rupees as 399 rupees and 100 paise and subtract 240 rupees and 50 paise from it.

399 rupees and 100 paise
-240 rupees and 50 paise

159 rupees and 50 paise

Example 3

Multiply

4 rupees and 50 paise
x 5

20 rupees and 250 paise, which is the same as
20 rupees and 2 rupees and 50 paise, which is the same as
22 rupees and 50 paise

Example 4

Martha had 13 rupees; her mother gave her 20 rupees. How much money does she have now?

Martha now has $(20 \text{ rupees} + 13 \text{ rupees}) = 33 \text{ rupees}$, as

13 rupees
+20 rupees

33 rupees

Example 5

Ranjan bought a book costing 24 rupees. If he gave the shopkeeper a 50-rupees note, how much money should the shopkeeper return to him?

The money the shopkeeper should return to Ranjan is $(50 \text{ rupees} - 24 \text{ rupees}) = .26 \text{ rupees}$ as

4 1
5 0 rupees
- 2 4 rupees

2 6 rupees

Example 6

The cost of an orange is 2 rupees. What would be the cost of 4 oranges?

Cost of 1 orange = 2 rupees

Cost of 4 oranges = $4 \times 2 = 8$ rupees = Rs 8

Example 7

Vinita bought a pencil for 1 rupee, a pen for 12 rupees and 50 paise and a book for Rs 24 and 50 paise. How much money she should pay the shopkeeper?

She should pay the shopkeeper

1 rupee

12 rupees and 50 paise

+24 rupees and 50 paise

37 rupees and 100 paise, that is the same as

37 rupees and 1 rupee, which is the same as

38 rupees.

Example 8

Ravi has 12 rupees and 50 paise and his sister has 5 rupees. How much more money does Ravi has than his sister?

Ravi has (12 rupees and 50 paise – 5 rupees) more, as

12 rupees and 50 paise

- 5 rupees

7 rupees and 50 paise

Example 9

An egg costs 1 rupee and 50 paise. What would be the cost of 6 eggs?

Cost of 6 eggs would be

1 rupee 50 paise

$\times 6$

6 rupees 300 paise = 6 rupees + 3 rupees = 9 rupees

Exercise 7.2

Add the following:

1.	26 rupees +47 rupees ----- -----	125rupees +635rupees ----- -----	247 +355 ----- -----
2.	35 rupees and 23 paise +47 rupees and 59 paise ----- -----.	138 rupees and 70 paise +374 rupees and 25 ----- -----.	
3.	58 rupees and 25 paise +78 rupees and 75 paise ----- -----	267 rupees and 80 paise +483 rupees and 30 paise ----- -----	
4.	25 rupees and 20 paise 48 rupees and 50 paise +70 rupees and 40 paise ----- -----	324 rupees and 40 428 rupees and 50 e +148 rupees and 30 -----	

Exercise 7.3

Subtract

1. 50 rupees
–27 rupees

269 rupees
–145 rupees

400 rupees
–250 rupees

2. 35 rupees and 75 paise
–23 rupees and 40 paise

240 rupees and 80 paise
–125 rupees and 25 paise

3. 50 rupees
–14 rupees and 50 paise

80 rupees
–74 rupees and 25 paise

4. 25 rupees and 50 paise
–18 rupees and 25 paise

20 rupees
– 8 rupees and 25 paise

Exercise 7.4

Multiply

1. 6 rupees 8 rupees 25 rupees 50 rupees
 $\times 4$ $\times 3$ $\times 2$ $\times 6$

2. 24 rupees 45 rupees 30 rupees 15 rupees
 $\times 2$ $\times 3$ $\times 4$ $\times 6$

3. 3 rupees and 20 paise 12 rupees and 25 paise
 \times 3 \times $\times 3$

4. 6 rupees and 50 paise 3 rupees and 20 paise
 $\times 4$ $\times 6$

5. 5 rupees and 25 paise 1 rupees and 50 paise
 $\times 5$ $\times 7$

Exercise 7.5

1. Gita bought a toffee costing 50 paise and a lollipop costing 50 paise. How much money should she give to the shopkeeper?
 2. Ronald had 25 rupees, his mother gave him 50 rupees and his father gave him 50 rupees on his birthday. How much money does he have now?
 3. Bilal had 55 rupees. He bought a toy costing 26 rupees. How much money is left with him?
 4. Suman has 25 rupees and her brother has 40 rupees. How much more money does her brother have?
 5. The cost of an orange is 2 rupees. How much money you would have to pay if you bought 6 oranges?
 6. Ranjana's mother bought potatoes worth 3 rupees and 50 paise, onions worth 5 rupees and tomatoes worth 2 rupees and 50 paise. How much money she should pay the vegetable vendor?

If she pays the vendor a 20-rupee note, how much money should the vendor return to her?

7. A pencil costs 1 rupee and 50 paise. What would be the cost of 6 pencils?

If a box of 6 pencils costs 8 rupees. How much money do you save by buying a box of 6 pencils?

8. Sunita bought 6 bananas. If a banana costs 1 rupee and 25 paise, how much money did she spend on bananas?

If she also bought a watermelon costing 24 rupees. How much money did she spend in all?

Reading or Making a Bill

When we shop for a number of things from a shop, the shopkeeper makes a bill listing the items, the quantity and price of each item against it. He then totals prices of all the items to find out the amount we should pay him. This is called a bill. For example, the bill for shopping of a student is given below

The bill shows the following information:

Item	Price per item	Quantity	Price
Mathematics for class III	Rs 32	1	Rs 32.00
Pencils	Rs 5	3	Rs 15.00
Notebooks	Rs 12	4	Rs. 48.00
All items			Rs. 95.00

- The first column shows the items bought by the student.
This student bought a mathematics book, 3 pencils and 4 notebooks. The last row of first column reads all items.
- The second column shows the price of each item that the student bought.
The cost of mathematics book was Rs. 32 the cost of 1 pencil was Rs. 23 and cost of 1 notebook was Rs. 12.
- The third column shows the number of different items the student bought.
The student bought 1 notebook, 3 pencils and 4 notebooks.
- The fourth column shows the price of all the items that the student bought. The cost of 1 mathematics book was Rs 32 the cost of 3 pencils was Rs 15 and cost of 4 notebook was Rs 48. The last row of this column gives total bill of all items bought by this student that is Rs 95.

Exercise 7.6

1. The prices of various items quoted by a fruit vendors were as follows:

Item	Price
Apples	Rs 40 per kg
Bananas	Rs 20 per dozen(1 dozen = 12)
Grapes	Rs 80 per kg
Oranges	Rs 30 per kg

Use this table to find the price of

- (a) 1 kg of apples
- (b) 2 kg of apples
- (c) $\frac{1}{2}$ kg of apples
- (d) 6 bananas
- (e) $\frac{1}{4}$ kg of grapes

(f) Make bills for customers who bought the following items:

- (i) 1 kg oranges, 6 bananas and half a kg of apples
- (ii) 1 kg oranges, one dozen bananas and one fourth kg of grapes
- (iii) 12 bananas, half a kg of apples and half a kg of grapes

UNIT 8

Measurement

Length

We often need to measure length, height or distance of objects. If each of you measured the length and breadth of the room by footsteps would the answer be the same. (No)

Why?

We need standard units for that so that everyone agrees about the measurements of things.

Standard units for measuring length

Centimetre

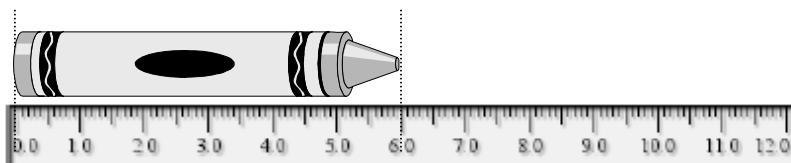
A unit of length is the centimetre. The line segment given below is

one centimetre long. It is written in short as cm.

We can use a ruler to measure length of small objects such as pencil, notebook, nail, pen and brush by keeping a ruler below these so that they touch the ruler all along and one end of these is just above the zero of the ruler and reading the ruler marking below the other end.

Centimetre ruler

We can use a 15 or 30 centimetre ruler to measure length of small objects such as pencil, notebook, nail, pen and brush by keeping these in a horizontal or vertical position and marking lines at the end of these. Then keep the ruler in the same position with zero at one of the lines and read the ruler marking of the other line.

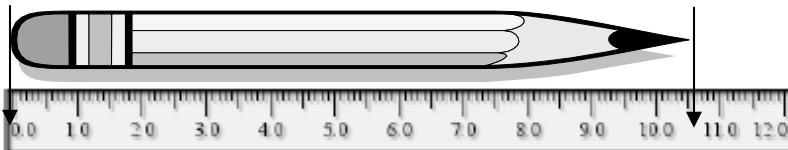


The length of the crayon is 6 cm.

Measuring to the nearest centimetre

If the thing that you may want to measure does not have a number marked above the second edge but falls between two numbers, then take the number that is nearer to it is its measure. It is called measuring to the nearest

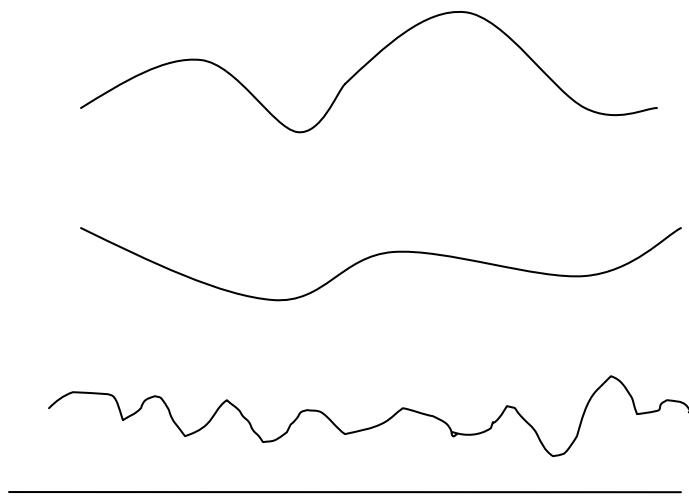
centimetre. If it falls exactly in the middle of two numbers, we take the larger number as its measure to the nearest centimetre.



For example, the length of the pencil is between 10 and 11 cm, but it is closer to 11 cm, we therefore say its length to the nearest centimeter is 11 cm.

Measurement of curved lines or distances around objects with curved edges

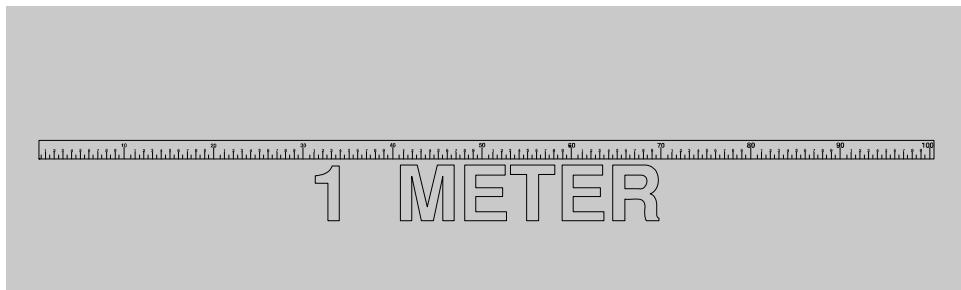
A ruler cannot be used for measuring curved lines or distances around objects with curved edges such as distance around a cup, or a cylindrical box.



We can first use strings to measure distance around curved edges of these objects and then find out the length of a string by the ruler.

Metre

For measuring larger lengths, heights and distances, we use larger units. You would have seen the cloth merchant using a rod for measuring cloth. It is called a metre stick. It is divided into 10 equal parts and each is called a **decimetre**. A metre is the same as 10 decimetres.



Show children a metre by showing a metre rod or a metre long stick and ask children to make a list of three things that are about a metre long, more than a metre long and less than a metre long.

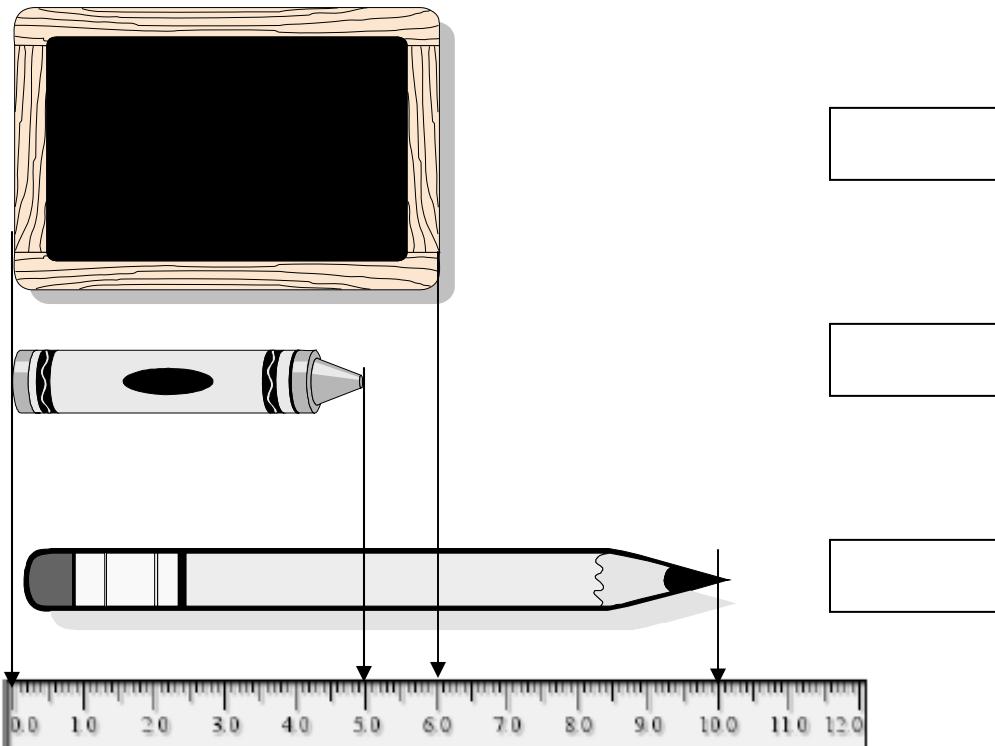
Show children a decimetre by showing its marking on a metre rod or a decimetre long stick and ask children to make a list of three things that are about a decimetre long, more than a decimetre long and less than a decimetre long.

A decimetre is further divided into 10 parts each of which is equal to 10 centimetres.

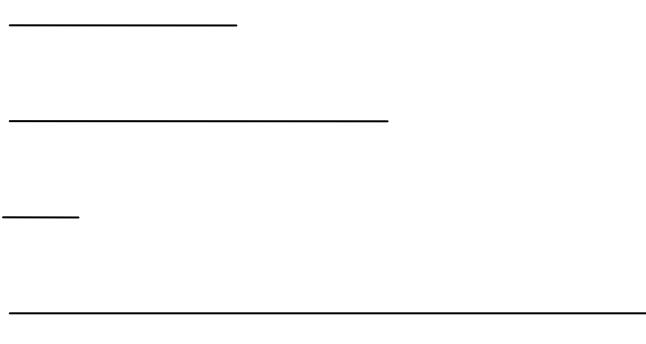
We generally use metres and centimetres. A metre is the same as 100 centimetres. Show children a tape marked in metres and centimetres and ask them to measure the length and width of a room.

Exercise 8.1

1. Find the length of the following objects in centimetres and write it in the box, remember to write cm after the number:



2. Measure the length of the line segments given below with a centimetre scale and write the measure in the box:



3. Draw line segments whose lengths are given below:

1 cm

4 cm

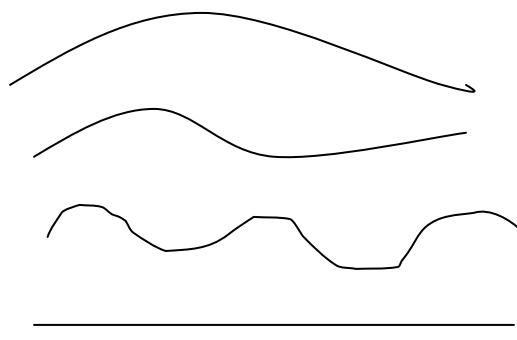
5 cm

7 cm

4. Measure the length of the line segments given below to the nearest centimetre and write it in the box:



5. Measure the lines given below using a string first and then find out length of the string to the nearest centimetres by the ruler and write it in the box:



6. How many decimetres are there in a metre?
7. How many centimetres are there in a decimetres?
8. How many centimetres are there in a metre?
9. A centimetre is about the same length as what objects.
10. A decimetre is about the same length as what objects.
11. A metre is about the same length as what objects.

12. Convert the following to decimetres:

$$1 \text{ metre} = \underline{\hspace{2cm}} \text{ decimetres}$$

$$3 \text{ metres} = \underline{\hspace{2cm}} \text{ decimetres}$$

$$2 \text{ metres } 3 \text{ decimetres} = \underline{\hspace{2cm}} \text{ decimetres}$$

13. Convert the following to centimetres

$$1 \text{ decimetres} = \underline{\hspace{2cm}} \text{ centimetres}$$

$$4 \text{ decimetres} = \underline{\hspace{2cm}} \text{ centimetres}$$

$$3 \text{ decimetres } 4 \text{ cm} = \underline{\hspace{2cm}} \text{ centimetres}$$

14. Convert the following to centimetres

$$1 \text{ metre} = \underline{\hspace{2cm}} \text{ centimetres}$$

$$6 \text{ metres} = \underline{\hspace{2cm}} \text{ centimetres}$$

$$6 \text{ metres } 25 \text{ centimetre} = \underline{\hspace{2cm}} \text{ centimetres}$$

15. Convert the following to metres

$$10 \text{ decimetres} = \underline{\hspace{2cm}} \text{ metres}$$

$$30 \text{ decimetres} = \underline{\hspace{2cm}} \text{ metres}$$

$$45 \text{ decimetres} = \underline{\hspace{2cm}} \text{ metres}$$

100 centimetres = ____ metres

400 centimetres = ____ metres

254 centimetres = ____ metres and ____ centimetres

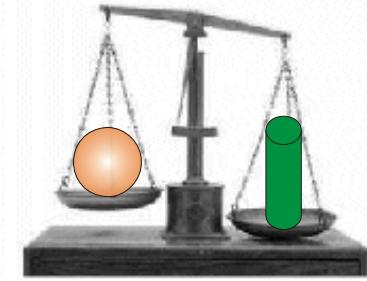
16. What units (metre, decimetre or centimetre) you would use for measuring the following:

- (a) length of a match box-
- (b) height of a room-
- (c) width of a chair-
- (d) length of your school Hall
- (e) length of your pencil box

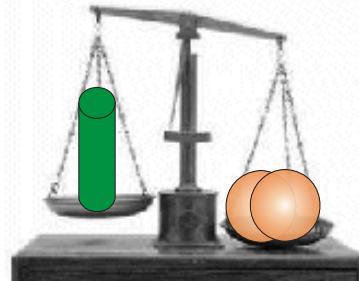
Weight

Ask students to take out two objects of different weight from their school bag, one in each hand and ask the student to tell which one weighs more and which one weighs less. The object that weighs more is called **heavier** and the object that weighs less is called **lighter**.

We can also tell which object weighs more by using a balance. The side of the balance with heavier objects goes down.



Cylinder is heavier than the sphere



One cylinder is lighter than two spheres

We can use smaller objects like marbles to measure and compare weights in terms of those.

Activity 8.1

Ask students to weigh a number of objects using marbles or other objects of the same weight.

Activity 8.2

Ask students to compare the weights of two objects by first finding their weight in terms of marbles.

Activity 8.3

Show using a balance two clay balls have the same weight. Then change the shape of one and ask them if they have the same weight.

Repeat with balls of different weight till they can see that changing the shape does not change the weight.

Capacity

Ask children to bring empty bottles, plastic mugs etc. and ask them which of two specific containers would contain more?

Which of two specific containers would contain less?

Would any of these containers contain about the same amount of water?

The quantity of liquid a container can hold is called its **capacity**.

Ordering objects in order of capacity

We can compare the capacity of two containers by filling one container with water and pouring it in the other, if the second is full and some water is left over in the first, the first one has more capacity. On the other hand if we can pour all the water and second one is still not filled then the first one has less capacity. If the second is also full and no water is left over, both have the same capacity. We can estimate the capacity of a big container in terms of a mug by pouring in it mugs of water till it fills and counting the number of mugs used to fill it. We can also compare the capacity of two containers by this procedure. The container that requires larger number of mugs to fill it has more capacity

Activity 8.4

Ask students to find the capacity of a container say a bucket in terms of a small jug. Repeat it for other containers.

Activity 8.5

Ask students to compare the capacity of two containers by first finding the capacity of two containers in terms of a smaller container.

Activity 8.6

Take two containers having the same amount of water in them. Pour a certain amount of water from one container to another having a different shape and ask if the two containers have the same amount of water, If some students say no, then pour it back in the empty container to demonstrate that it is the same.

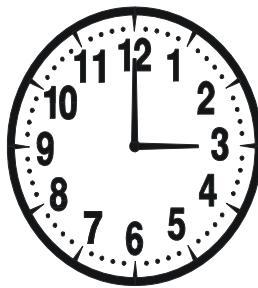
Repeat it with containers of different sizes till they can see that the amount of a liquid is conserved when transferred to a container of different shape.

UNIT 9

Time

A clock helps us to find out what time it is?

The face of a clock is given below:



It is marked with numerals 1 to 12. It has two hands. The shorter hand is the **hour hand**, the longer hand is the minute hand, and their position tells us the time.

The hands always move in the same direction. The direction in which the hands move is called **clockwise** direction. The opposite direction is called **counter clockwise or anti clockwise** direction.

The hour hand takes one hour to move from one numeral to the next.

The minute hand takes 5 minutes to go to the next numeral or 60 minutes or one hour to come back to the same numeral.

The position of the minute hand and hour hand tells us the time. When both the minute hand and hour hand are at 12 the time is 12 O'clock.

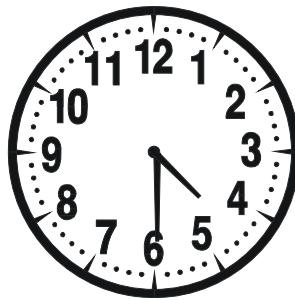
A clock shows 12 O'clock both at noon and mid-night.

The duration of the time from one mid-night to next mid-night forms a day.

A day has 24 hours.

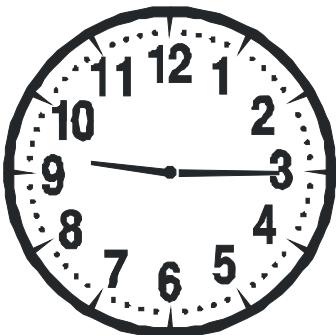
When the minute hand points to 12 and the hour hand points to a number say 5, the time is 5 O' clock.

When the minute hand points to a numeral other than 12, the hour hand would be between two numerals. When the minute hand is at 6 and the hour hand is in the middle of two numerals, say 4 and 5 as in the clock given below the time is half past four.

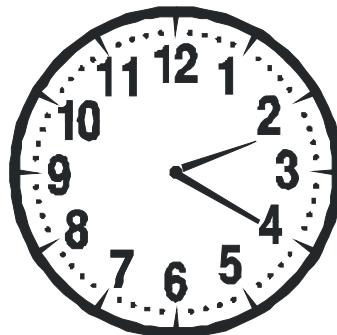


Half past four

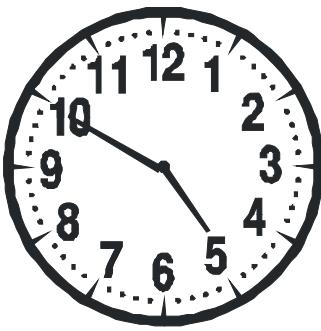
If the minute hand points exactly to a number other than 6 or 12, we can find time by looking at the numeral to which the minute hand points to and counting by five as many numbers as the numeral beginning with one. For example, in the first clock the minute hand is at 3 so we count 3 numbers by five-5, 10 and 15, the time then is 15 minutes past the numeral after which the hour hand points to in this case 9. Verify the time on other clocks is as given below them. Note that 30 minutes past three is the same as half past three.



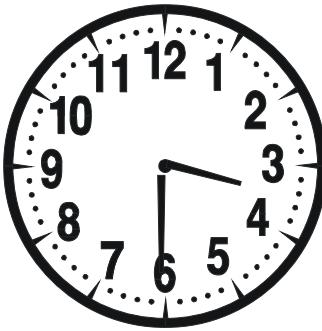
15 minutes past nine



20 minutes past two

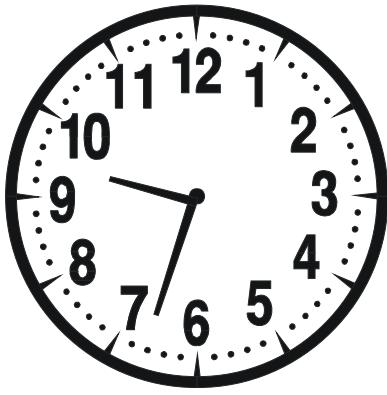


50 minutes past four

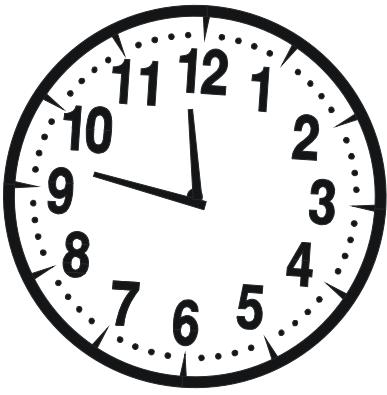


30 minutes past three

If the minute hand points to a dot between two numerals, then count by 5 up to the smaller numeral and add to it the number of dots after the numeral to which minute hand points to. Note that the minute hand takes one minute to move from one dot to the next dot. Verify the time on the clocks given below:



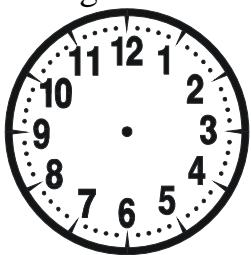
33 minutes past nine



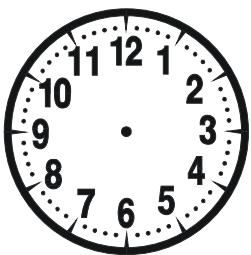
47 minutes past eleven

Exercise 9.1

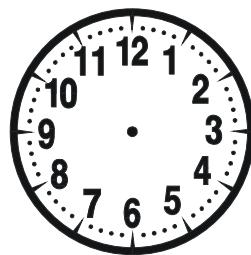
Draw the hour hand and minute hand on the face of the clocks to show the time given below them:



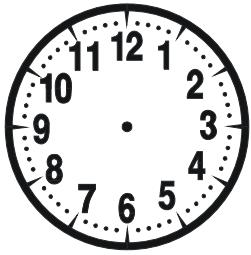
5 O'clock



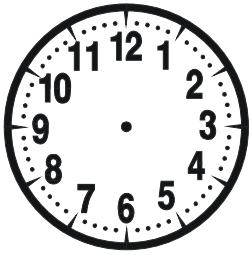
9 O'clock



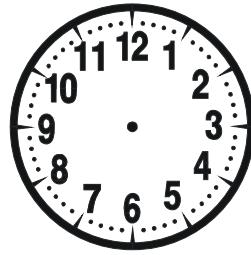
10 O'clock



Half past six

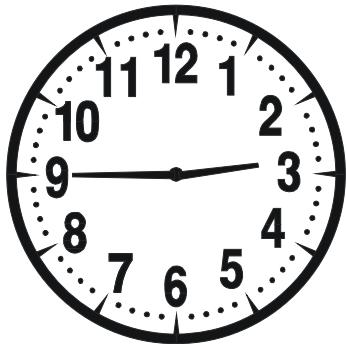


12 O'clock

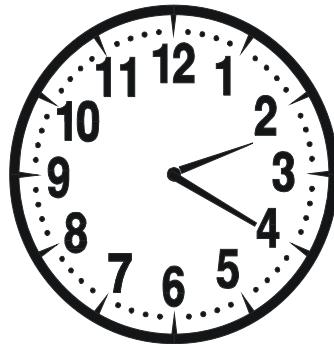


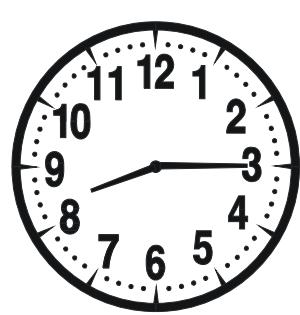
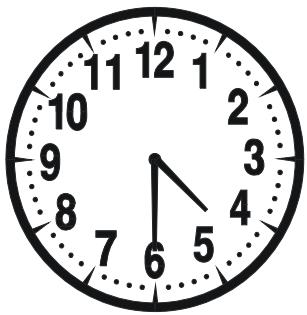
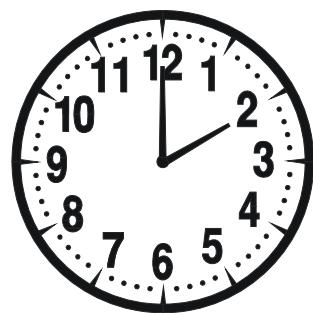
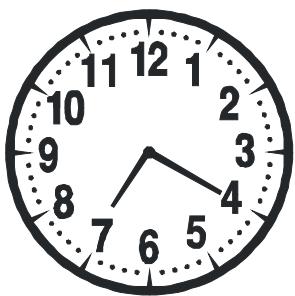
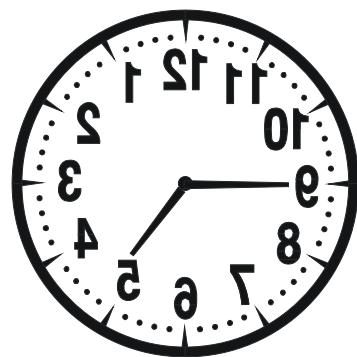
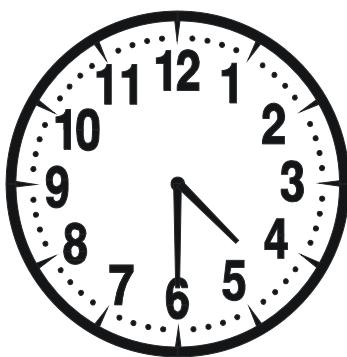
Half past nine

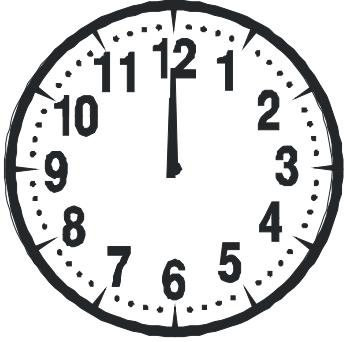
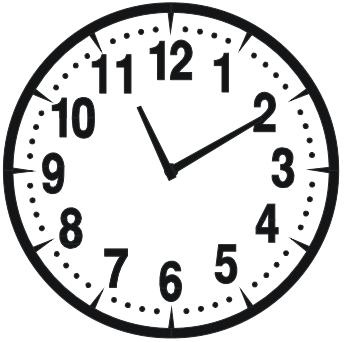
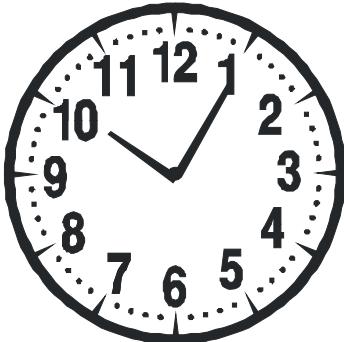
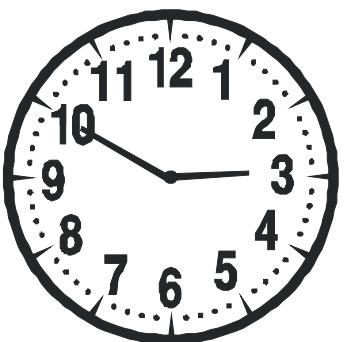
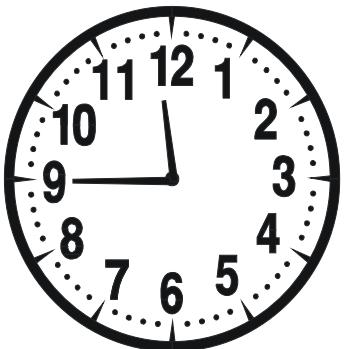
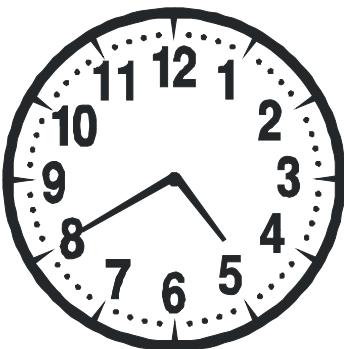
Write the time shown on the clocks in the box given below them:

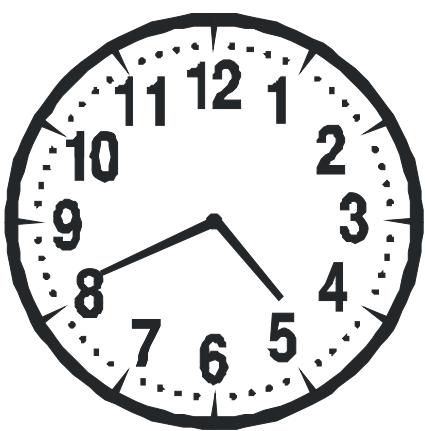
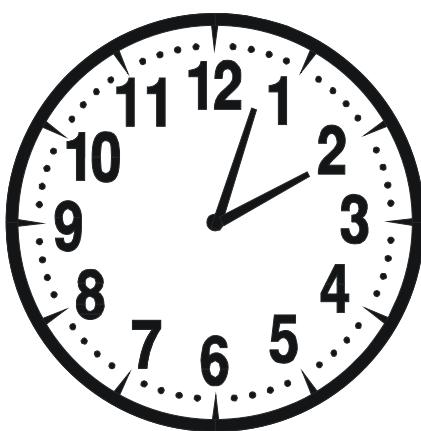
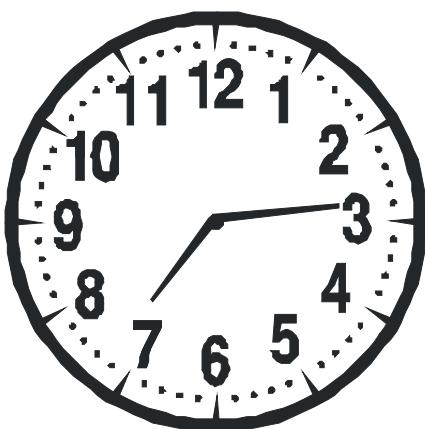
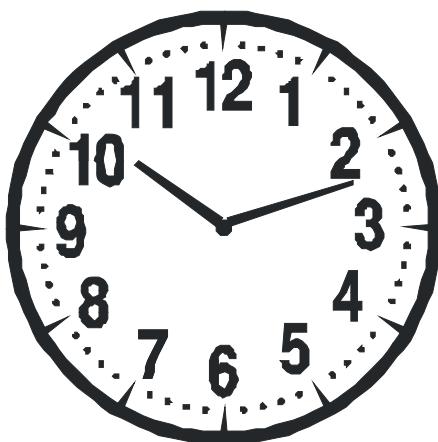


45 minutes past two









Days, months and year

Time keeps passing. Each day is followed by another day. The time of a particular event e.g. birth, death is specified by the day, month and year. The day Christ the founder of Christian religion was born is taken as first day of year zero in present numbering of years. The years before that are counted as so many years before Christ. The month and days in a year are as follows:

There are 12 months in a year.

January is the first month of the year and has 31 days.

February is the second month of the year and has 28 or 29 days.

March is the third month of the year and has 31 days.

April is the fourth month of the year and has 30 days.

May is the fifth month of the year and has 31 days.

June is the sixth month of the year and has 30 days.

July is the seventh month of the year and has 31 days.

August is the eighth month of the year and has 31 days.

September is the ninth month of the year and has 30 days.

October is the tenth month of the year and has 31 days.

November is the eleventh month of the year and has 30 days.

December is the twelfth month of the year and has 31 days.

Days in each month begin with 1 and increase by one till the number of days it has.

A year begins with first day of January and ends with 31st of December.

It has 365 or 366 days.

After December January of next year would come and the other months would follow in the same order.

A day is specified by day, month and year and is called the **date**. It is important to know the date when an event took place e.g. when a person was born, when a letter was written. We write a date as 7.4.2004 or 7th April, 2004.

Calendar

Show a calendar of the current year.

A calendar shows months of a year and days in a month.

A calendar also shows there are 7 days in a week- Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday and these are followed again by these days in order in the next week.

A calendar is helpful in finding the days of the week on which a particular day would fall or the date on which first Sunday would fall. Can you suggest some situations in which you would want to know these?

Give examples of dates of important festivals and demonstrate how to find the day of the week for these from a calendar; and the day of the month on which first Sunday or last Saturday of a month would fall.

Exercise 9.2

1. Fill in the blanks:

1 hour = ____ minutes

1 day = ____ hours

1 week = ____ days

2. Name the days of the week in order.

3. Name the months of a year in order and days in each

5. Fill in blanks

March is the _____ month of the year.

June is the _____ month of the year.

November is the _____ month of the year.

December is the _____ month of the year.

6. Name the second month of the year.

Name the eighth month of the year.

Name the tenth month of the year.

7. Write the date 5.7.2004 in a different way.

8. Write 4 April, 2005 in a different way.

9. Write the date today in two ways.

10. On which day or days is your school closed?

11. Republic day is on 26 January, find the day of the week on which it would fall this year.

12. When is your birthday? Find the day of the week on which it would fall this year.

13. Where do you find dates written in your surroundings?

UNIT 10

Sort, organize and display data.

Ask students to cut squares with different animals in Activity Sheet 10.1 and paste these in squares beginning with the second row in Activity sheet 10.2 so that each column has a unique property. Make sure that there are no blank squares between two animals in a column

When all the shapes are pasted, ask students

1. How many columns of animals are there?
2. What names would you give to different columns?
3. Write the names in the first row at the top of the column.
4. How many animals are in different columns?
5. Which column has the largest number of animals?
6. Which column has the smallest number of animals?

Ask students to cut squares with different shapes in Activity Sheet 10.3 and paste these in squares in Activity sheet 10.4 so that each column has a unique property. Make sure that there are no blank squares between two shapes in a column

When all the shapes are pasted, ask students

1. How many columns of blocks are there?
2. How many figures are in different columns?
3. Which column has maximum number of figures?
4. Which column has the fewest figures?
5. What name would be appropriate for each column?

Pictographs

A pictograph is a graph that uses pictures to give information.

Draw four lines on the board and label the rows with the four most popular fruits. Tell the students they should come up one by one and draw a smiley face in the row of the fruit they like the most of the four fruits listed

Fruits we like

Banana	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Guava	☺ ☺ ☺ ☺ ☺ ☺
Orange	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Apple	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺

Then ask students

1. How many students like banana the most?
2. How many students like apple the most?
3. Which row had the most pictures? What does that mean?
4. Which row had the fewest pictures? What does that mean?

In the above pictograph, each face represents one student.

If the number of objects is large, a face can be used to represent two or more objects. We write it at the bottom of the pictograph.

Now make a second chart near the first one in which a face represents two objects.

Now ask students,

1. We found out that 14 children liked banana the most, how many smiley faces should we draw against banana?
2. How many smiley faces should we draw against guava, orange and apple?

Fruits we like the most

Banana	☺ ☺ ☺ ☺ ☺ ☺ ☺
Guava	☺ ☺ ☺
Orange	☺ ☺ ☺ ☺ ☺ ☺
Apple	☺ ☺ ☺ ☺

☺ = 2 students

Draw the smiley faces and ask children,

1. How many students does each face represent?"
2. How many students like banana the most?
3. How many students like apple the most?
4. Which row had the most pictures?
5. Which row had the least pictures?
6. When a smiley face represents two, how do you show that ten people chose that vegetable?
7. When a smiley face represents two persons, how do you show that eleven people chose that vegetable?
8. Describe how to make a pictograph.

Exercise 10.1

1. The pictograph given below shows children in a class born in different months:

January	☺ ☺ ☺
February	☺ ☺ ☺ ☺ ☺ ☺
March	☺ ☺ ☺ ☺ ☺
April	☺ ☺
May	☺
June	☺ ☺ ☺
July	☺ ☺ ☺ ☺
August	
September	☺ ☺ ☺
October	☺ ☺ ☺ ☺
November	☺ ☺ ☺
December	☺ ☺

- How many children were born in January?
 - How many children were born in October?
 - How many children were born in August?
 - In which month maximum number of children were born?
 - In which month minimum number of children were born?
 - What is the total number of children in the class?
2. The students collected flowers given in Activity Sheet 10.5. Cut and paste these and make a pictograph showing different flowers in Activity Sheet 10.6. The names of these flowers are as follows:



Hibiscus



Magnolia



Rose



Sunflower

Answer the questions given below from the pictograph you have made:

- How many Hibiscus flowers are there?
- How many Magnolia flowers are there?

- Which flower has the largest number?
- Which flower has the fewest number?
- How many more sunflowers are there than roses?

UNIT 11

Patterns

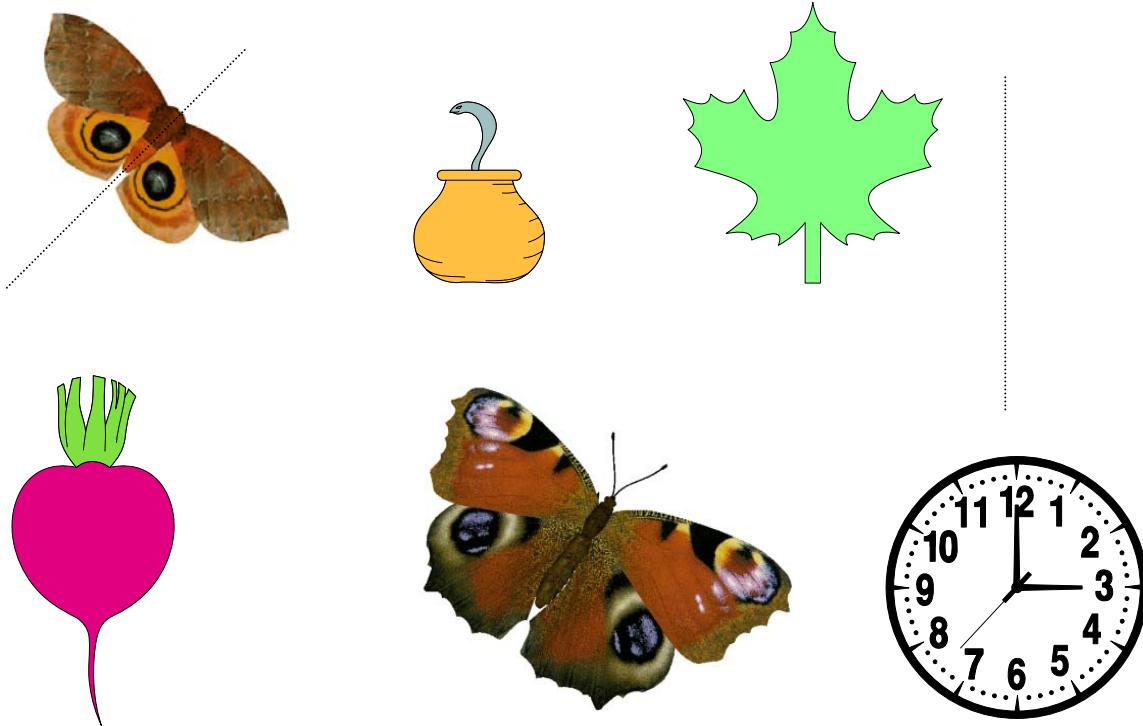
Identify symmetrical shapes and patterns

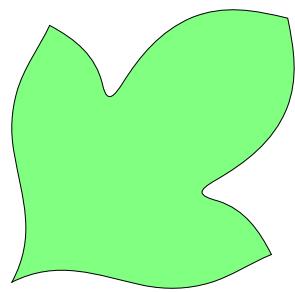
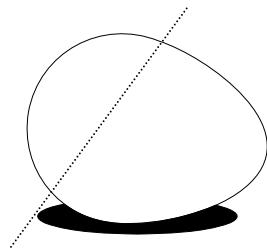
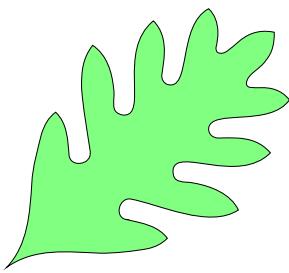
Demonstrate symmetrical shapes by drawing a line that divides a symmetrical figure into similar halves and a folding the paper on the line and opening it or using of a mirror for one half. Ask the students what do they notice about the figure? Some students would be able to point out that figure is the same on both sides of the fold or mirror. Tell them that if a picture can be folded along a line so that the two parts cover each other exactly, then the picture is said to be symmetrical. We find many examples of symmetrical things around us:

Ask them to collect leaves, pictures from magazines, geometrical shapes and tell which of these are symmetrical and which are not?

How did you find it out?

Which of these are symmetrical about a line?

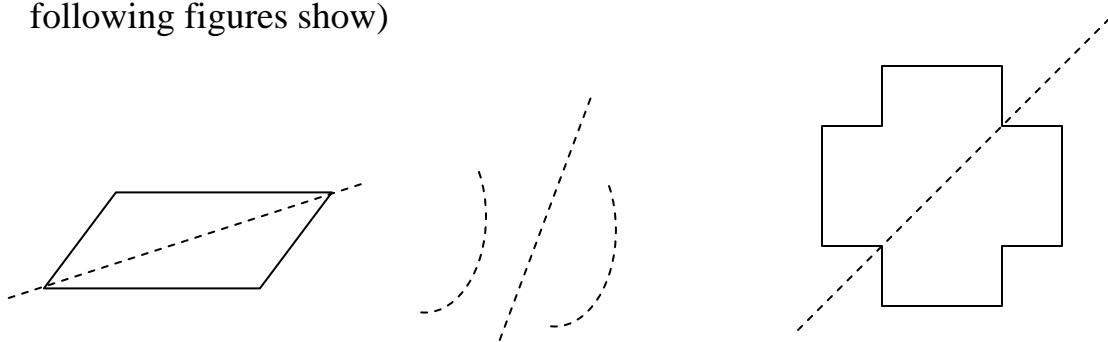




Fold a paper, make a design or figure on it and cut it and open it.

What do you notice? (It is symmetrical about the fold.)

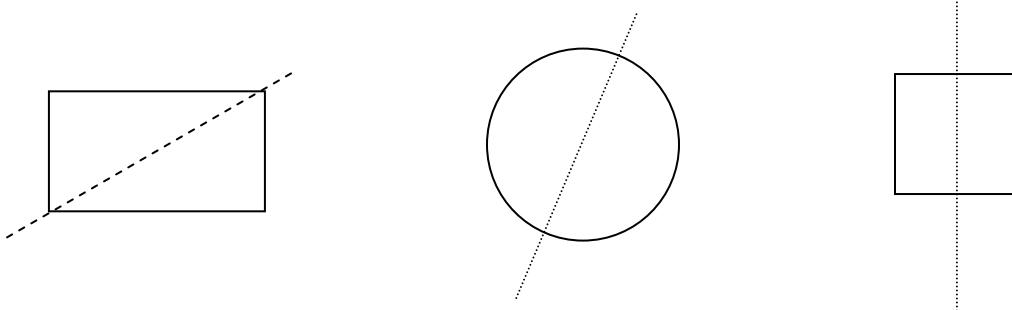
If line cuts a figure into half would it always symmetrical? (No, as following figures show)



Which of the following pictures are symmetrical about the dashed line of symmetry?

How did you find it out?

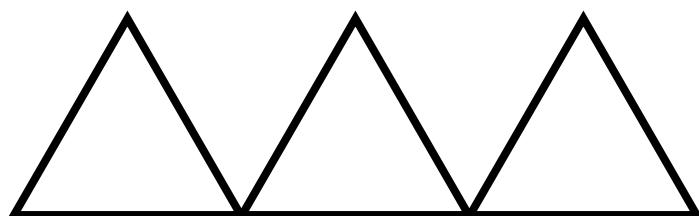
Can you draw some more lines of symmetry in these?

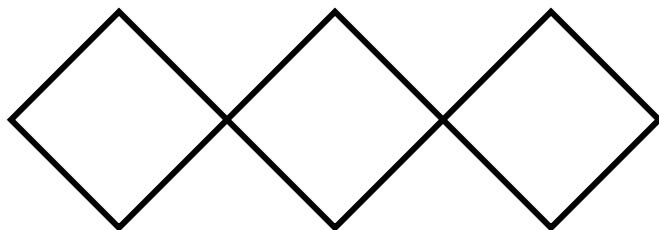
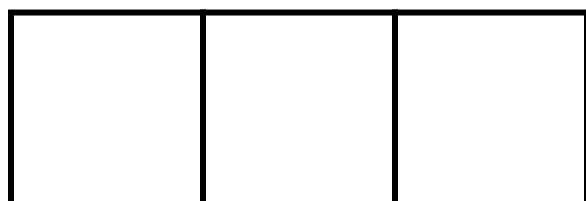
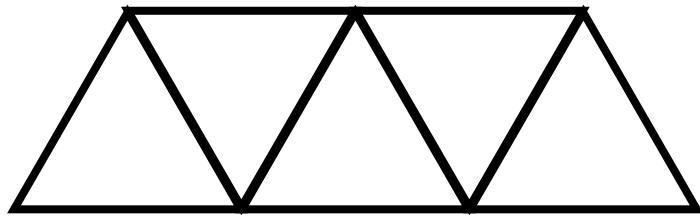


Making patterns with shapes and lines

Make the patterns given below with matches or toothpicks.

Continue the pattern





Make some new patterns with toothpicks or matches.

Look for some patterns in your surroundings and tell about them in the class.

Make patterns by drawing around geometrical shape-cards or tangram pieces.

Copy and extend patterns made by others.

Growing patterns

1. Make the next figure in the pattern given below:



How many dots are there in the next figure?

How long can you continue this pattern?

2. Make the next figure in the pattern given below:



How many dots will be there in the next figure?

How long can you continue this pattern?

3. Make the next figure in the pattern given below:



4. How many dots will be there in the next figure? How long can you continue this pattern?

Number patterns

1. Note the pattern in each of the following operations, fill in the blanks.

$$7 + 0 = 7$$

$$56 + 0 = 56$$

$$543 + 0 = \underline{\hspace{2cm}}$$

$$2. 6 \times 1 = 6$$

$$50 \times 1 = 50$$

$$68 \times 1 = 68$$

$$347 \times 1 = \underline{\hspace{2cm}}$$

$$3. 3 \times 10 = 30$$

$$7 \times 10 = 70$$

$$16 \times 10 = 160$$

$$36 \times 10 = \underline{\quad}$$

4. $560 \div 10 = 56$

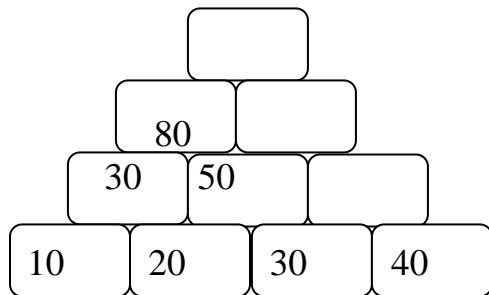
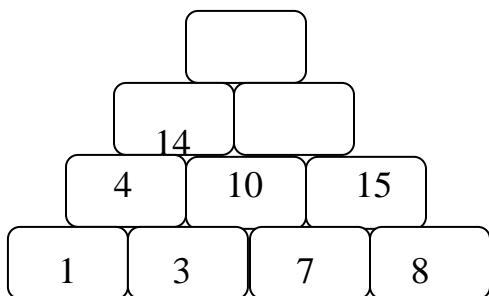
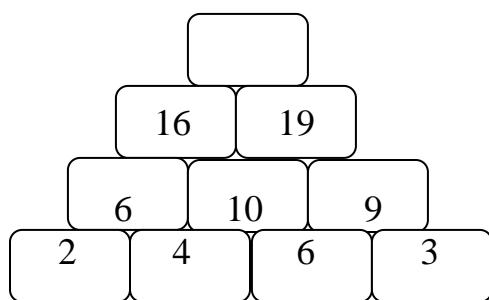
$$700 \div 10 = 70$$

$$80 \div 10 = 8$$

$$340 \div 10 = \underline{\quad}$$

$$400 \div 10 = \underline{\quad}$$

5. Find the pattern in writing the numbers in the towers given below and work out the missing number at the top of the towers.



Patterns in addends with the same sum

We can find many numbers whose sum is 7. For example,

$$7 + 0 = 7$$

$$6 + 1 = 7$$

$$5 + 2 = 7$$

$$4 + 3 = 7$$

$$3 + 4 = 7$$

$$2 + 5 = 7$$

$$1 + 6 = 7$$

$$0 + 7 = 7$$

Do you notice any patterns in the addends for the same number?

Find as many numbers as you can whose sum is 10, 9, 8.

Does the same pattern hold?

Patterns in addition of odd and even numbers

Which of the following numbers are even?

6, 9, 10, 16, 7, 5, 13

Which of the following numbers are odd?

2, 8, 3, 7, 9, 11

Is the sum of two even numbers always even? If no, give a counter example.

Is the sum of two odd numbers always odd? If no, give a counter example.

What would be the sum of an even and an odd number be odd or even?

For each of the following numbers write whether the sum would be even or odd?

$$3 + 7$$

$$6 + 12$$

$$5 + 10$$

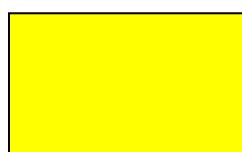
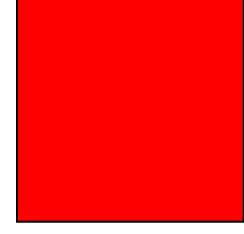
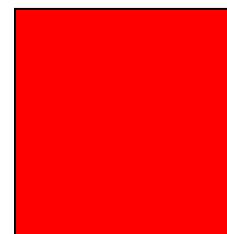
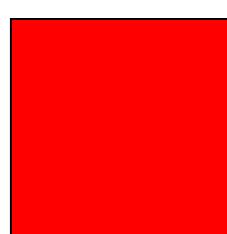
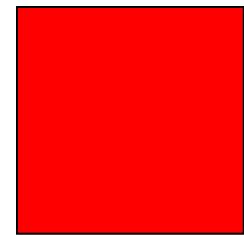
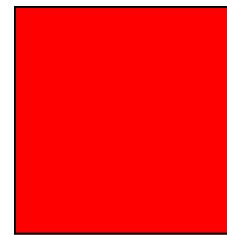
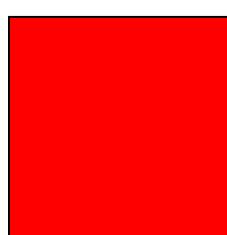
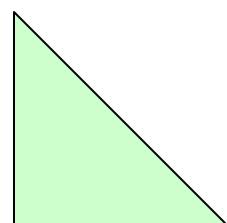
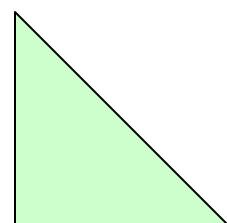
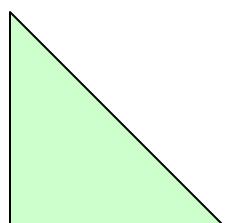
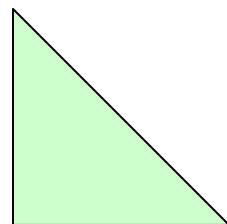
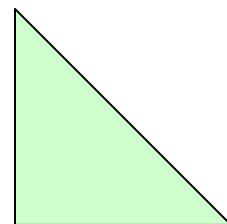
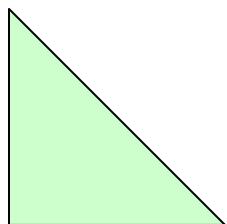
$$25 + 32$$

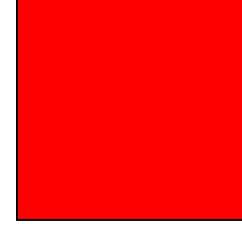
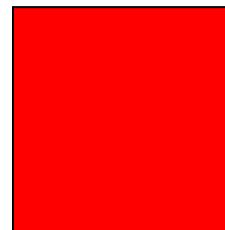
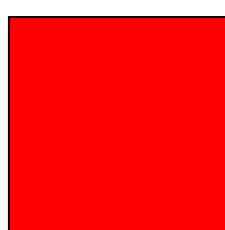
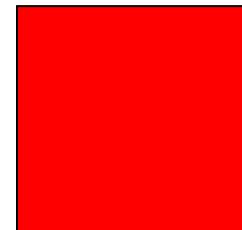
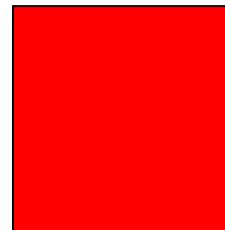
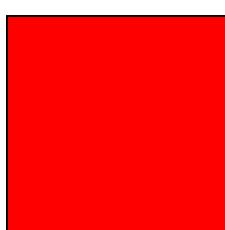
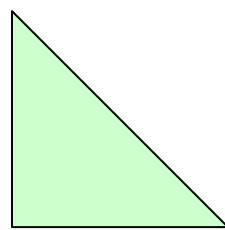
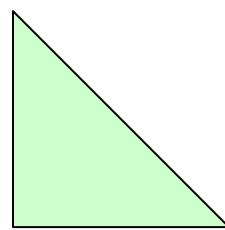
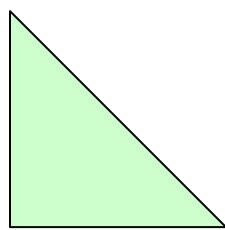
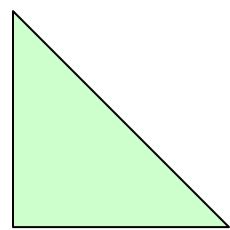
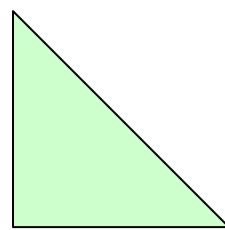
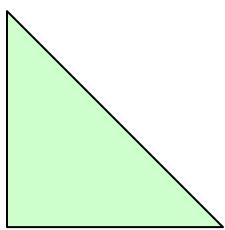
$$38 + 64$$

$$45 + 78$$

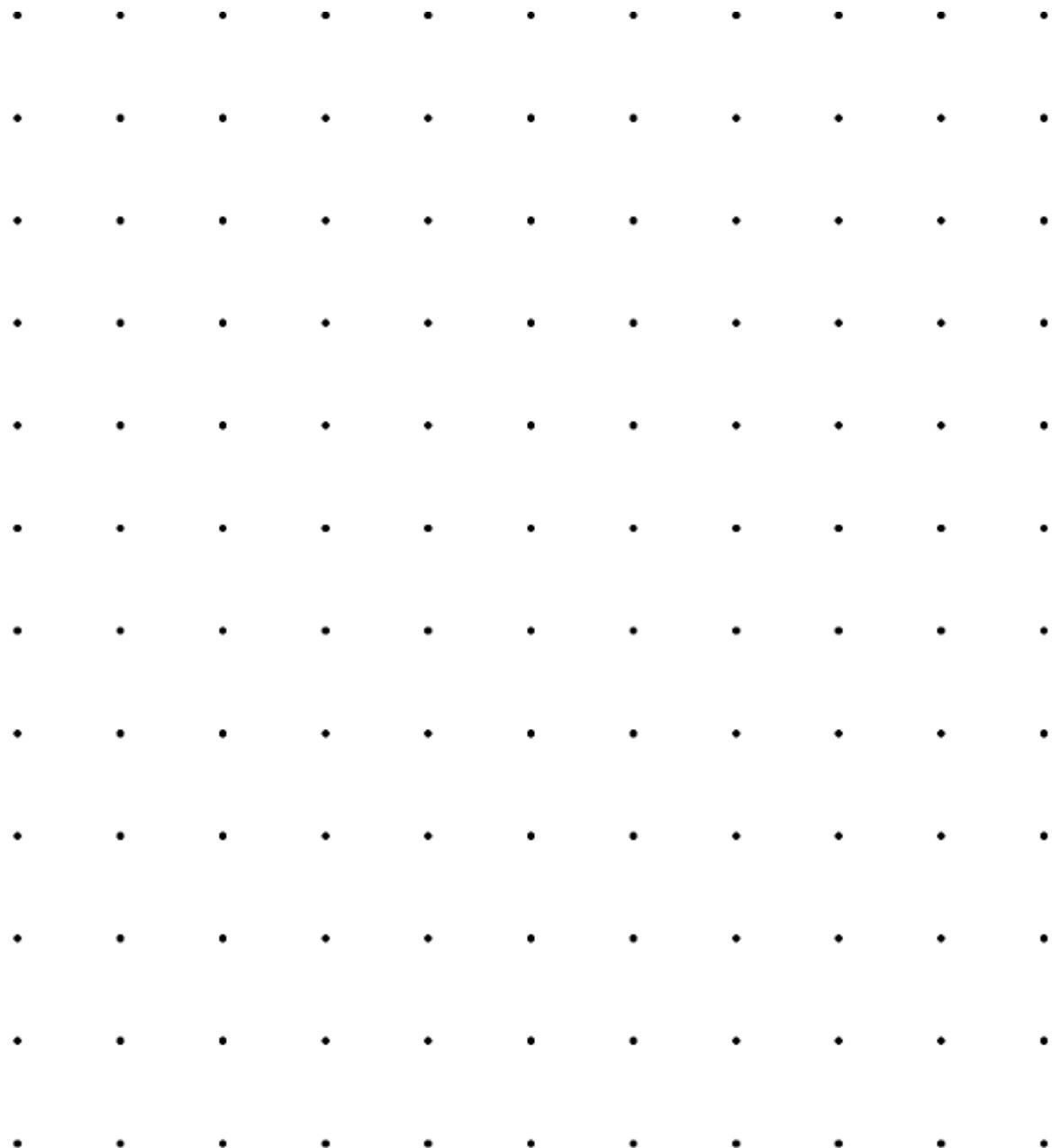
Activity Sheets

Activity Sheet 6.1

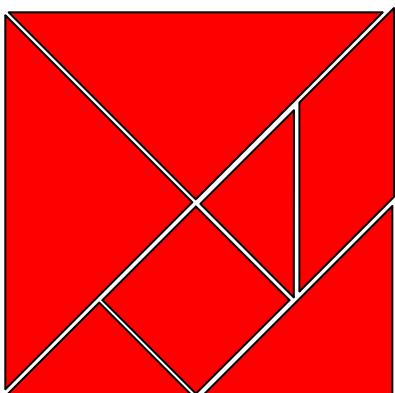
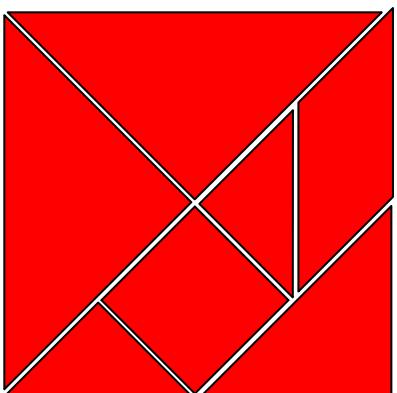
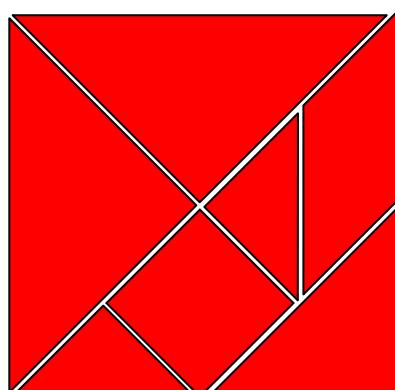
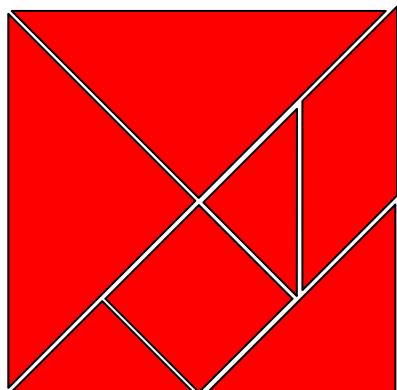
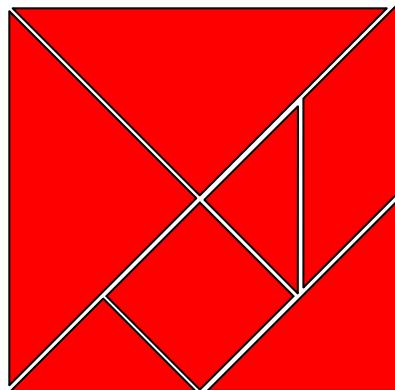
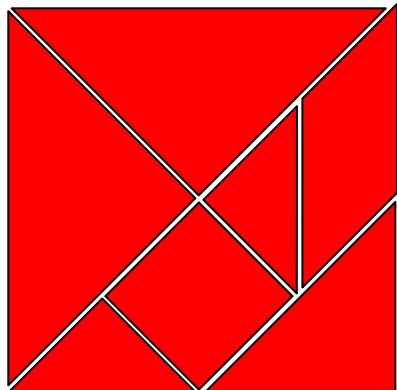




Activity Sheet 6.2

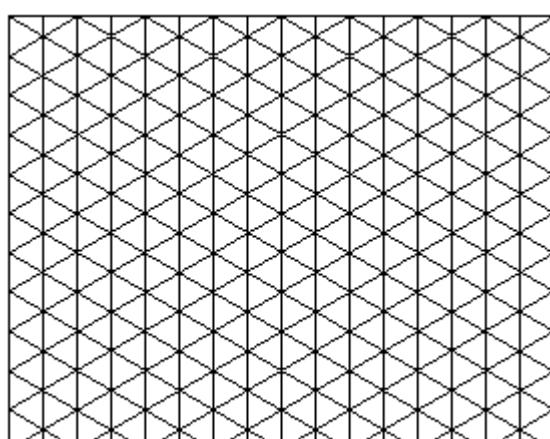
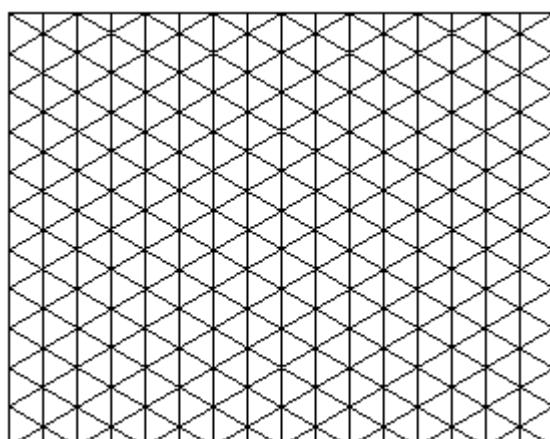
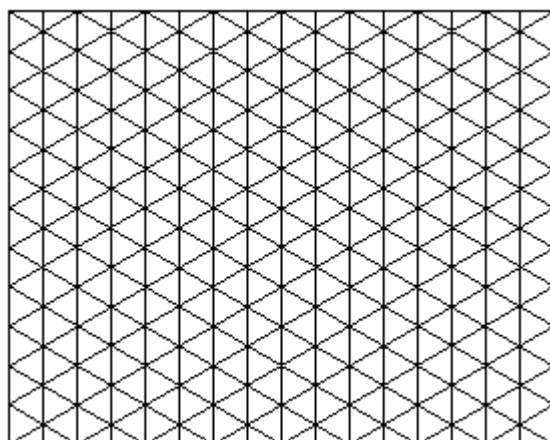


Activity Sheet 6.3

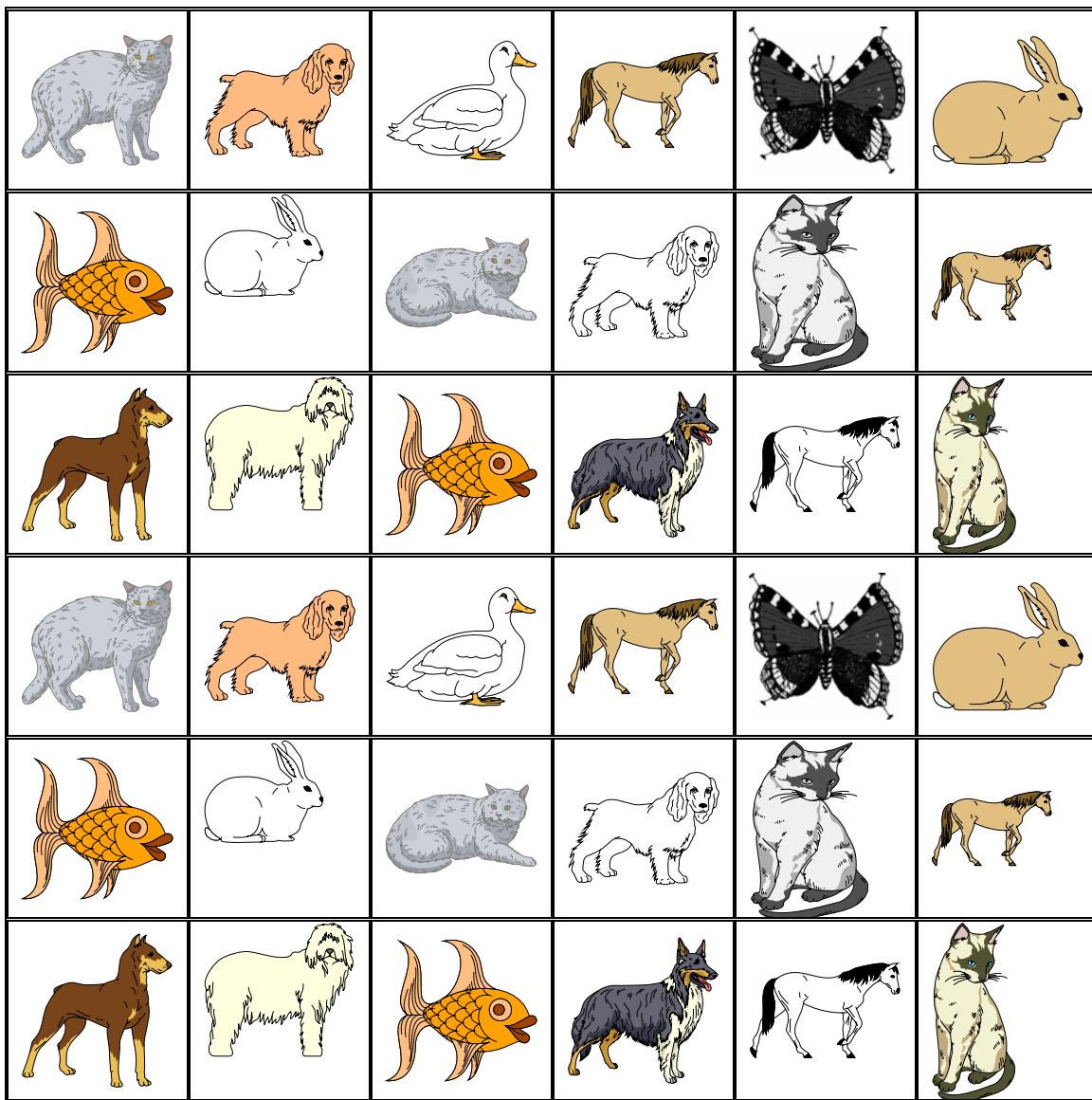


Activity Sheet 6.4

Isometric Grid

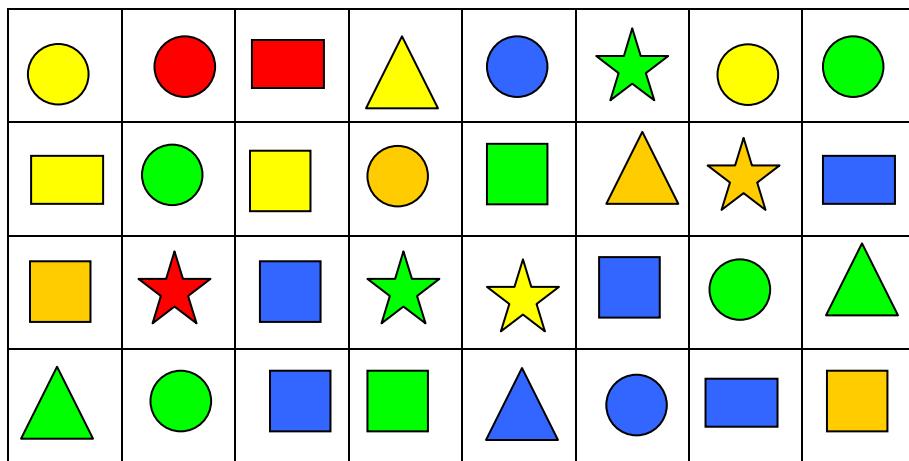


ACTIVITY SHEET 10.1



Activity Sheet 10.2

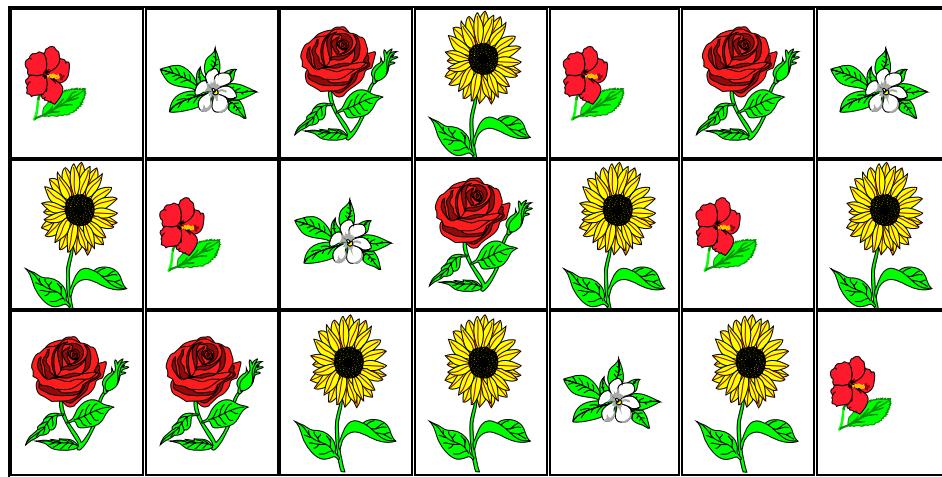
Activity Sheet 10.3



Activity Sheet 10.4

A blank 10x10 grid of squares, suitable for various applications such as a game board or a worksheet.

Activity Sheet 10.5



Activity Sheet 10.6

Hisbicus Flowers							
Magnolia Flowers							
Rose Flower							
Sunflower							

Answers to Selected Exercises

Exercise 1.2

4. 381, 613, 473, 256, 924, 140, 867, 792, 500, 380, 999, 248, 117.

Exercise 1.4

1. 400, 500
2. 289, 291
3. 640, 650
4. 930, 920
5. 442, 452
6. 500, 400
7. 499, 498
8. 775, 773
9. 355, 345
10. 516, 616

Exercise 1.5

2. 1, 40, 37, 64, 56, 7, 85, 100, 215, 134, 337, 430, 600, 207

Exercise 1.6

1. 10
2. 10
3. 526, 263, 487, 600, 805, 176, 349, 532, 784, 400, 206, 897, 915

Exercise 1.7

2. 647, 382, 450, 896, 13, 800

3. 5, 300, 100, 80, 1, 800, 0

4. 7, 100, 30, 6, 90, 8, 0

Exercise 1.8

>, >, <, <, >, >, <, <, >, <, <, >, <, >, <

Exercise 1.9

1. 178, 283, 456
372, 416, 485
329, 549, 678
239, 286, 742
49, 337, 451
2. 785, 382, 154
800, 756, 467
390, 238, 68
600, 458, 8
400, 28, 9
3. 72, 951, 632, 974, 860
4. 68, 57, 239, 467, 305
5. 48, 84
36, 63
257, 275, 572, 527, 752, 725
328, 382, 283, 238, 823, 832
906, 960, 609, 690

Exercise 2.2

- | | | | | |
|--------|--------|--------|--------|---------|
| 1. 449 | 2. 595 | 3. 377 | 4. 689 | 5. 998 |
| 6. 437 | 7. 696 | 8. 999 | 9. 798 | 10. 458 |

Exercise 2.3

- | | | | | |
|--------|--------|--------|--------|-------|
| 1. 768 | 2. 975 | 3. 969 | 4. 588 | 5.599 |
|--------|--------|--------|--------|-------|

Exercise 2.4

- | | | | | | |
|-----|-----|-----|-----|-----|-----|
| 648 | 728 | 899 | 396 | 789 | 877 |
| 747 | 798 | 996 | 509 | 798 | 789 |
| 879 | 889 | 799 | 989 | 886 | 479 |

Exercise 2.5

- | | | | | | |
|----|--------|-------|--------|--------|---------|
| 4. | 1. 652 | 2.791 | 3. 673 | 4. 723 | 5. 908 |
| | 6.443 | 7.600 | 8.702 | 9. 835 | 10. 925 |

Exercise 2.6

2.	1. 772	2. 825	3. 969	4. 734	5.825
	6. 845	7. 893	8. 941	9. 924	10. 997
	11. 848	12. 983	13. 964	14. 893	

Exercise 2.7

773	837	903	803	692	883
803	798	900	765	833	721
773	944	906			

Exercise 2.8

1. 673	2. 603	3. 717	4. 178	5. 365	
--------	--------	--------	--------	--------	--

Exercise 3.1

11	132	920	14	113	313
60	301	473	39	213	573

Exercise 3.2

1. 15	2. 212	3. 320	4. 132	5. 370	
6. 552	7. 323	8. 700	9.614	10. 431	

Exercise 3.3

15	442	725	44	153	822
122	532	333	73	163	300

Exercise 3.4

319	190	688	205	88	465
246	585	171	178	775	118
398	543	308			

Exercise 3.5

2. 328	3. 177	4. 277	5. 378	6. 447	
7. 176	8. 152	9. 543	10. 218	11. 256	
12. 108	13. 287	14. 157	15. 268		

Exercise 3.6

144	192	574	435	148	772
246	493	0	68	87	6
109	369	281			

Exercise 3.7

1. 458	2. 803	3. 85 boys	4. 135	5. 43	6. 25
7. 200, 75	8. 39	9. 31			

Exercise 4.1

$$2. 3 \times 3 \quad 3. 5 \times 6 \quad 4. 8 \times 7 \quad 5. 1 \times 5 \quad 6. 7 \times 4 \quad 7. 4 \times 8$$

Exercise 4.3

1. 2, 4, 6, 8, 10...All the numbers are even
2. 5, 10, 15, 20, 25 ...The numbers in one's place are 0 or 5.
3. 3, 6, 9, 12, 15...
4. 4, 8, 12, 16, 20...
5. 6, 12, 18, 24, 30...
6. 7, 14, 21, 28, 35 ...
7. 8, 16, 24, 32, 40...
8. 9, 18, 27, 36, 45,...

They are all equal to 9.

It is 1 less than the number in skip counting by 9

$$9 \times 2 = 2 \times 9, 9 \times 3 = 3 \times 9, 9 \times 4 = 4 \times 9 \dots$$

9. 2, 4, 6, 8, 10
10. The product of any number and 1 is the number.
11. The product of any number and 0 is 0.

Exercise 4.4

6	30	24	12	8	36	10	18	36	12	21	48
20	25	56	14	24	40						

Exercise 4.6

6	0	16	14	4	6	10	9	9	8	12	0
8	15	5	0	8	30	10	24	15	6	35	24
25	18	14	14	15	21	15	12	30	12	16	21
40	32	36	18	24	32	20	35	36	18	27	42
28	28	40	24	16	0	36	49	63	48	48	64
42	56	63	40	54	72	45	56	0	54	81	72

Exercise 4.7

1. 0-9 beginning with the second row.
2. 0-9 beginning with the second column.
3. In the first row of the first column.
4. Third
5. Sixth
7. As the row titled 2 and column titled 6 and the row titled 6 and column titled 2 both intersect at 12.
8. $12, 3 \times 4$

Exercise 4.8

1.0	0	0	90	300	210	65	37
2. 1 Hundred + 2 Tens,	473	3 Hundreds + 7 Tens,	242	764	5 Hundreds + 6 Tens	946	
3. 88	4. 45	5. 300	6. 68	7. 72	8. 448		
9. 420	10. 532	11. 603	12. 336	13. 245	14. 630		
15. 208	16. 376						

Exercise 4.9

1. 16	2. 18	3. 60	4. 168	5. 100	6. 24
7. 870	8. 496	9. 27	10. 2		

Exercise 5.1

1. $5 \times 3 = 15$
 $3 \times 2 = 6$
2. 7, 3 8, 6 5, 9 9, 7 6 8, 7 9
4. $25 \div 5 = 5$
5. $8 \div 2 = 4$

$$6. \ 24 \div 4 = 6$$

$$7. \ 12 \div 4 = 3$$

$$8. \ 42 \div 7 = 6$$

$$9. \ 9 \div 3 = 3$$

$$10. 16 \div 4 = 4$$

$$11. 12 \div 2 = 6$$

$$12. 30 \div 6 = 5$$

$$13. \begin{array}{ccccccccc} 4 & & 3 & & 3 & & 4 & & 7 \\ & 2 & & 3 & & 3 & & 6 & \\ & & & & & & 5 & & \\ & & & & & & 8 & & \\ & & & & & & & 7 & \\ & & & & & & & & 8 \end{array}$$

Exercise 5.4

$$1. 8$$

$$2. 10$$

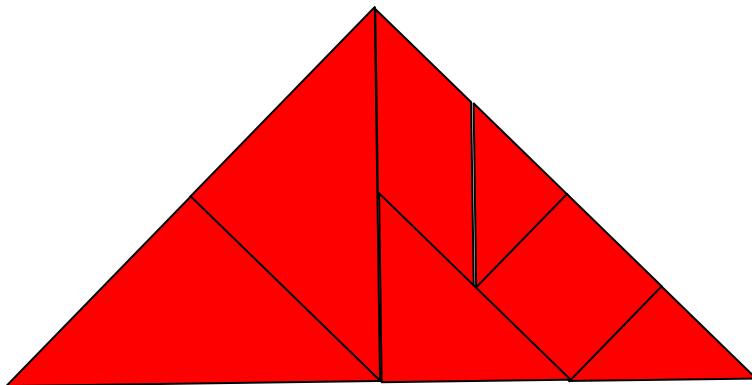
$$3. 11$$

$$4. 6, 2$$

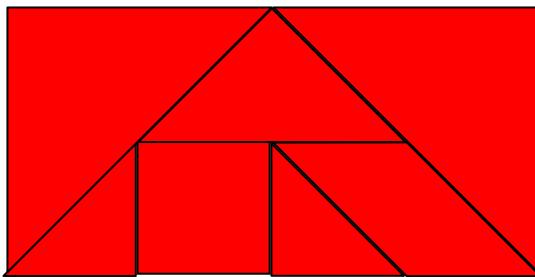
$$5. 6$$

$$6. 29$$

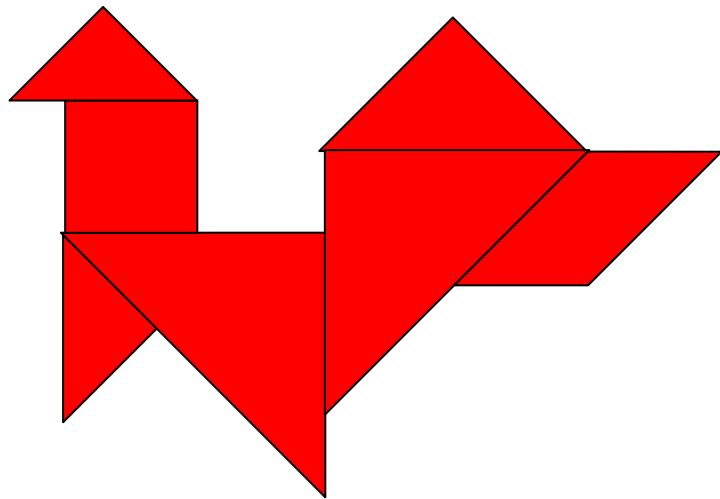
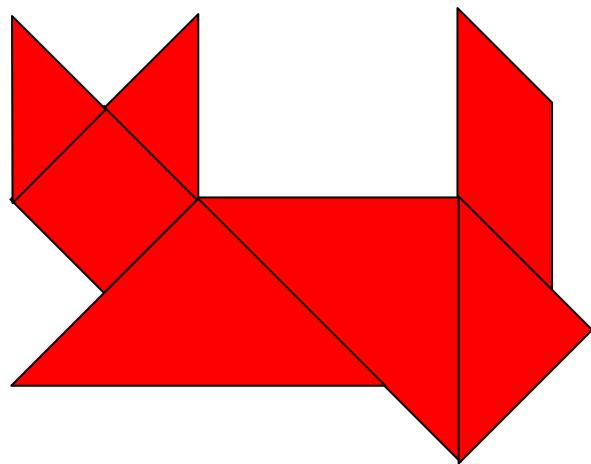
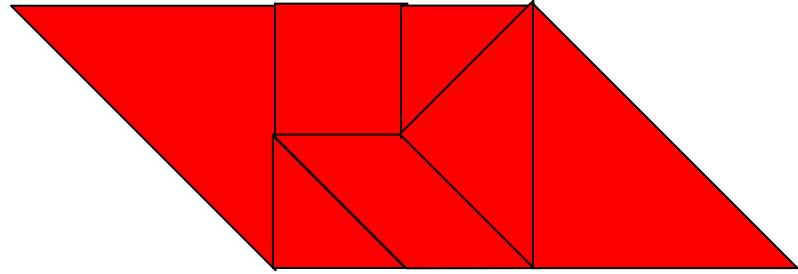
Activity 6.4 Triangle

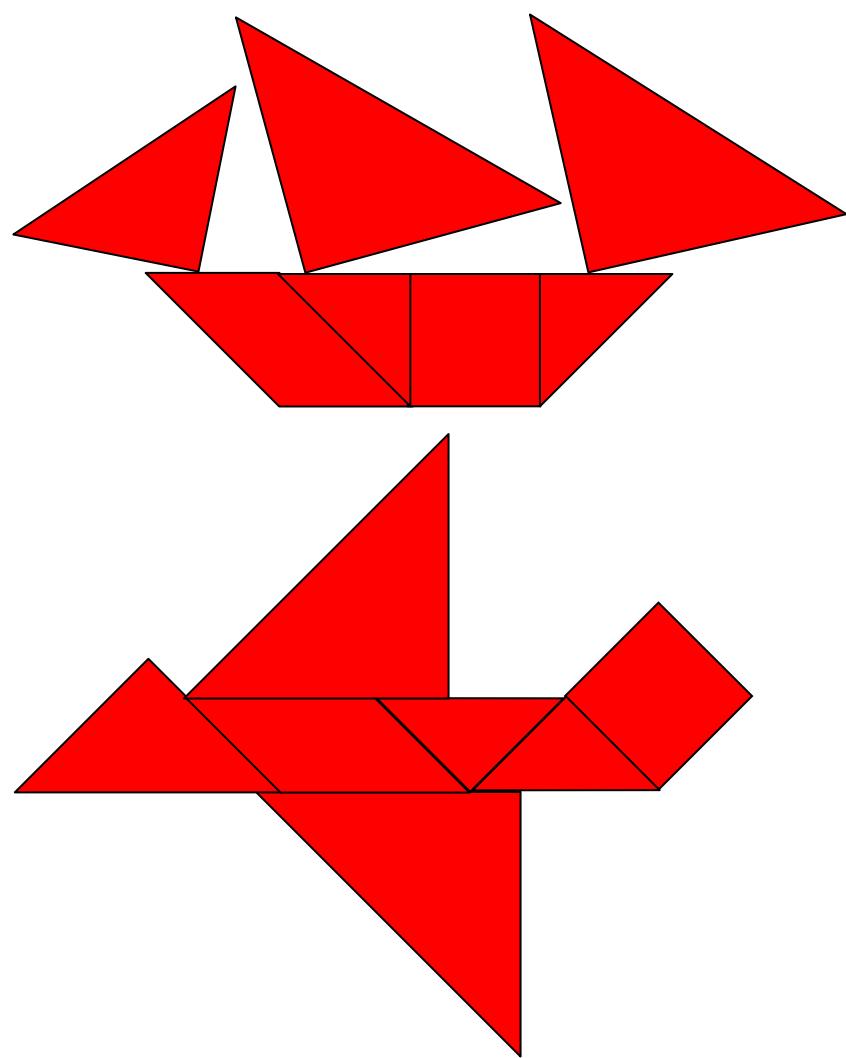


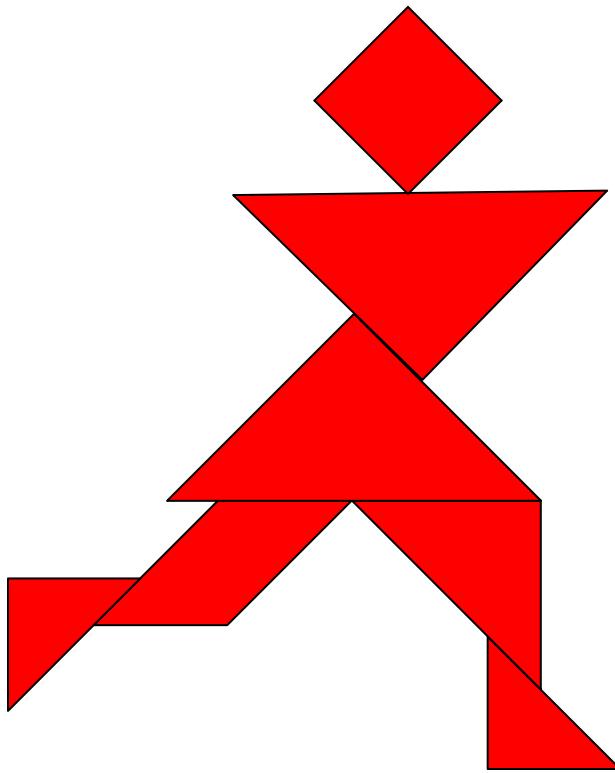
Rectangle



Parallelogram







Exercise 7.2

- | | | |
|----------------------------|----------|-------------------------|
| 1. 73 | 760 | 602 |
| 2. 65 paise | 76 paise | 1 rupee and 13 paise |
| 3. 82 rupees and 82 paise | | 512 rupees and 95 paise |
| 4. 137 rupees | | 751 rupees and 10 paise |
| 5. 144 rupees and 10 paise | | 901 rupees and 20 paise |

Exercise 7.3

- | | | |
|---------------------------|------------|-------------------------|
| 1. 23 rupees | 124 rupees | 150 rupees |
| 2. 12 rupees and 35 paise | | 115 rupees and 55 paise |
| 3. 35 rupees and 50 paise | | 5 rupees and 75 paise |
| 4. 7 rupees and 25 paise | | 11 rupees and 75 paise |

Exercise 7.4

- | | | | |
|--------------------------|------------|------------------------|-----------|
| 1. 24 rupees | 24 rupees | 50 paise | 3 rupees |
| 2. 48 rupees | 135 rupees | 120 rupees | 90 rupees |
| 3. 9 rupees and 60 paise | | 36 rupees and 75 paise | |

- | | |
|---------------------------|------------------------|
| 4. 26 rupees | 19 rupees and 20 paise |
| 5. 26 rupees and 25 paise | 10 rupees and 50 paise |

Exercise 7.5

1. 1 rupee 2. 125 rupees 3. 29 rupees 4. 15 rupees
5. 12 rupees 6. 11 rupees, 9 rupees 7. 9 rupees, 1 rupee
8. 7 rupees and 50 paise, 31 rupees and 50 paise

Exercise 7.6

- (a) 40 rupees (b) 80 rupees (c) 20 rupees (d) 10 rupees
(e) 20 rupees
(f) (i)

Item	Price	Quantity	Price
Apples	Rs.40 per kg	Half a kg	Rs.20
Bananas	Rs. 20 per dozen	Half a dozen	Rs.10
Oranges	Rs. 30 per kg	1 kg	Rs.30
Total			Rs.60

(ii)

Item	Price	Quantity	Price
Grapes	Rs.80 per kg	One-fourth of a kg	Rs.20
Bananas	Rs. 20 per dozen	1 dozen	Rs.20
Oranges	Rs. 30 per kg	1 kg	Rs.30
Total			Rs.70

(iii)

Item	Price	Quantity	Price
Apples	Rs.40 per kg	Half a kg	Rs.20
Bananas	Rs. 20 per dozen	1 dozen	Rs.20
Grapes	Rs.80 per kg	Half a kg	Rs.40
Total			Rs.80

Exercise 8.1

1. 6 5 10
2. 3 5 1 8
4. 4 4 8 6 1
5. 7 6 8 6
6. 10
7. 10
8. 100

12. 10 30 23 .
13. 10 40 34
14. 100 600 625
15. 1 3 4 2, 54
16. centimetre decimeter centimetre metre centimetre